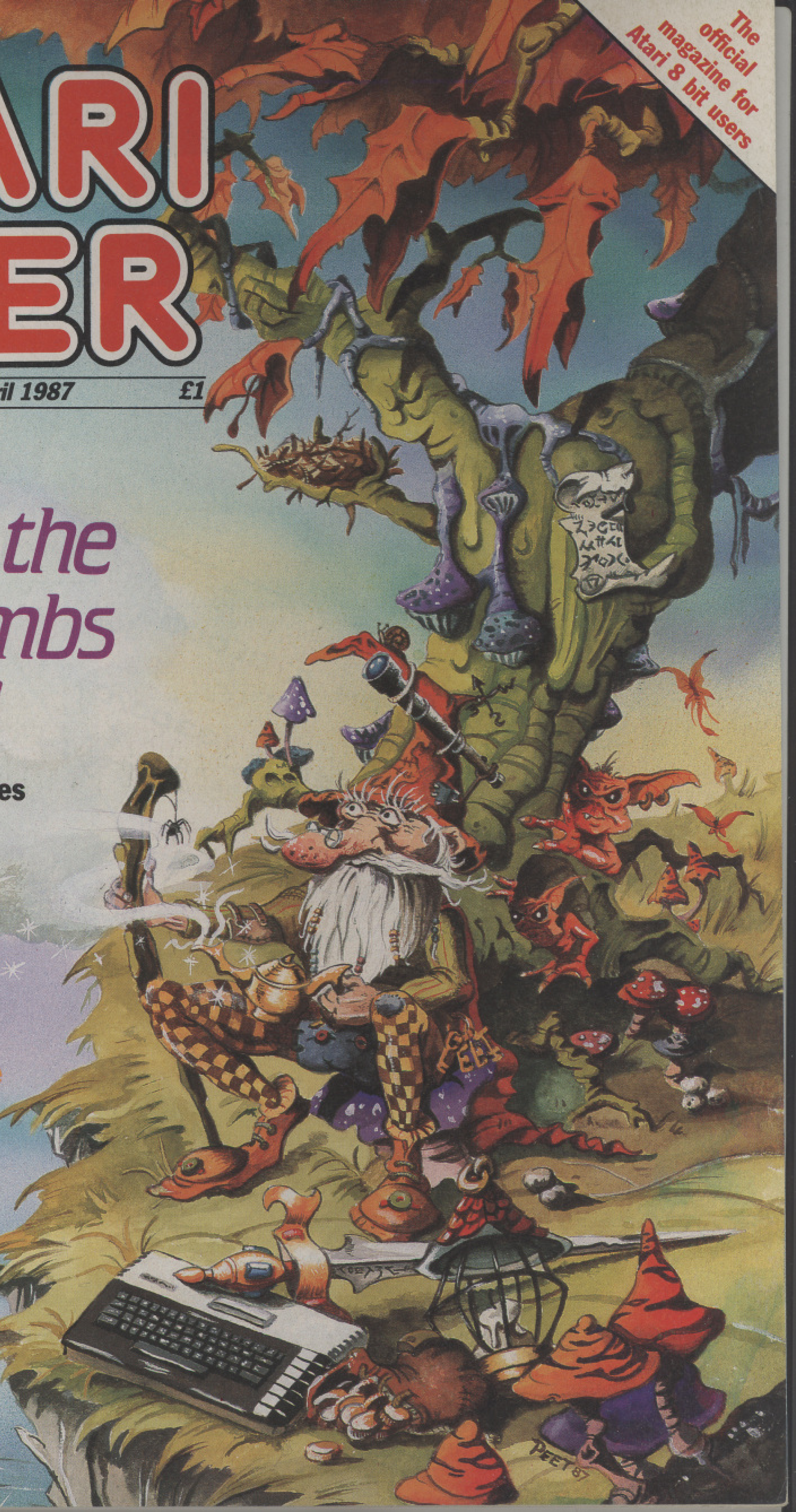
A Database Publication

ATARI USER

The official magazine for Atari 8 bit users

Vol. 2 No. 12 April 1987 £1



Explore the catacombs of Zork!

Start of a great series of adventure maps

Construct a cheap Centronics interface

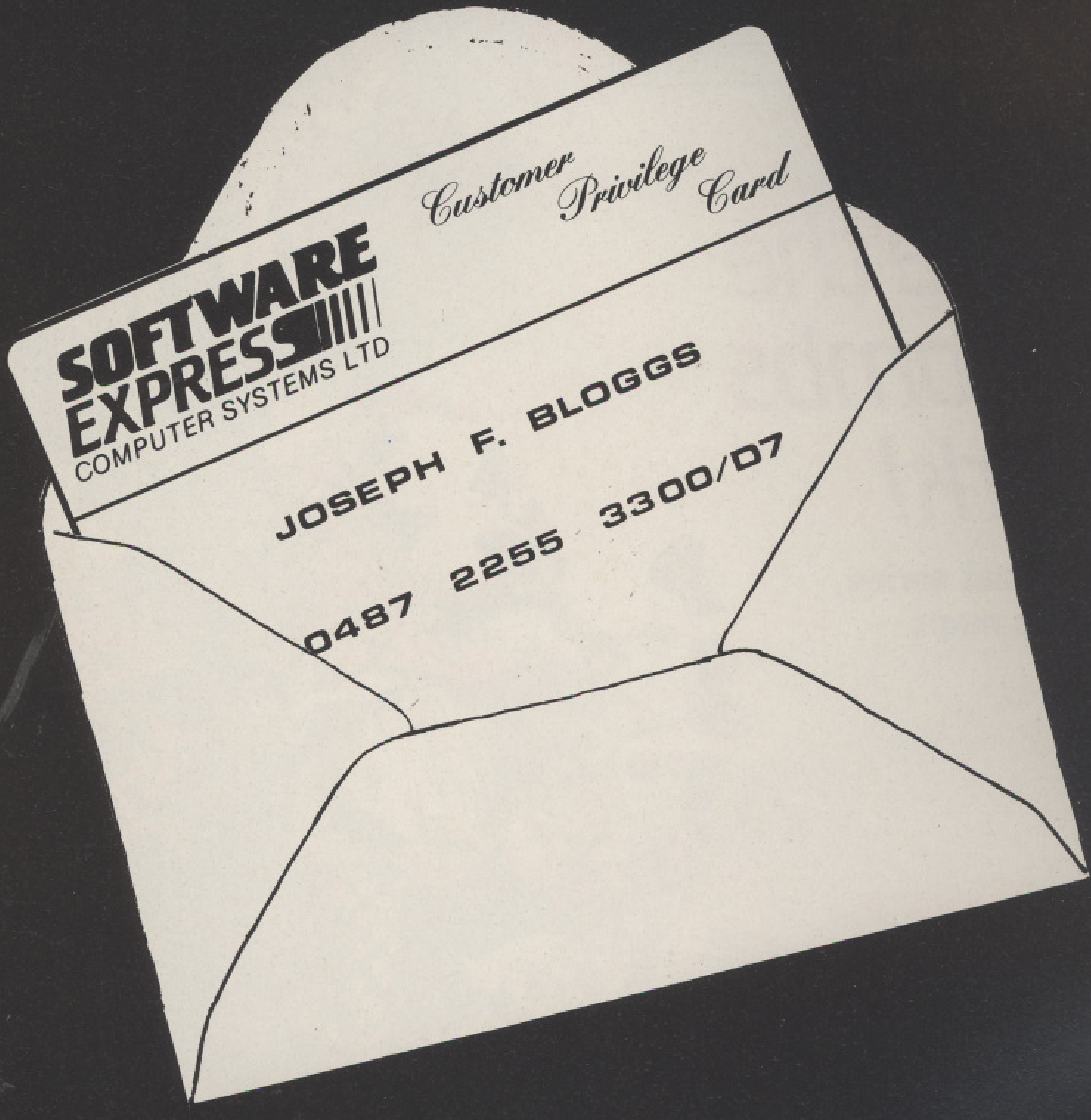
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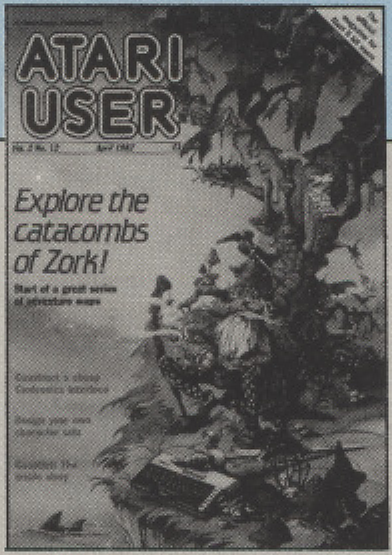
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Contents



Vol. 2 No. 12 April 1987

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Subscriptions: **061-480 0171**
Telecom Gold: **72:MAG001**
Telex: **265871 MONREF G Quoting Ref. 72:MAG001**
Prestel Mailbox: **614568383**

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

ABC 33,573 January-June, 1986

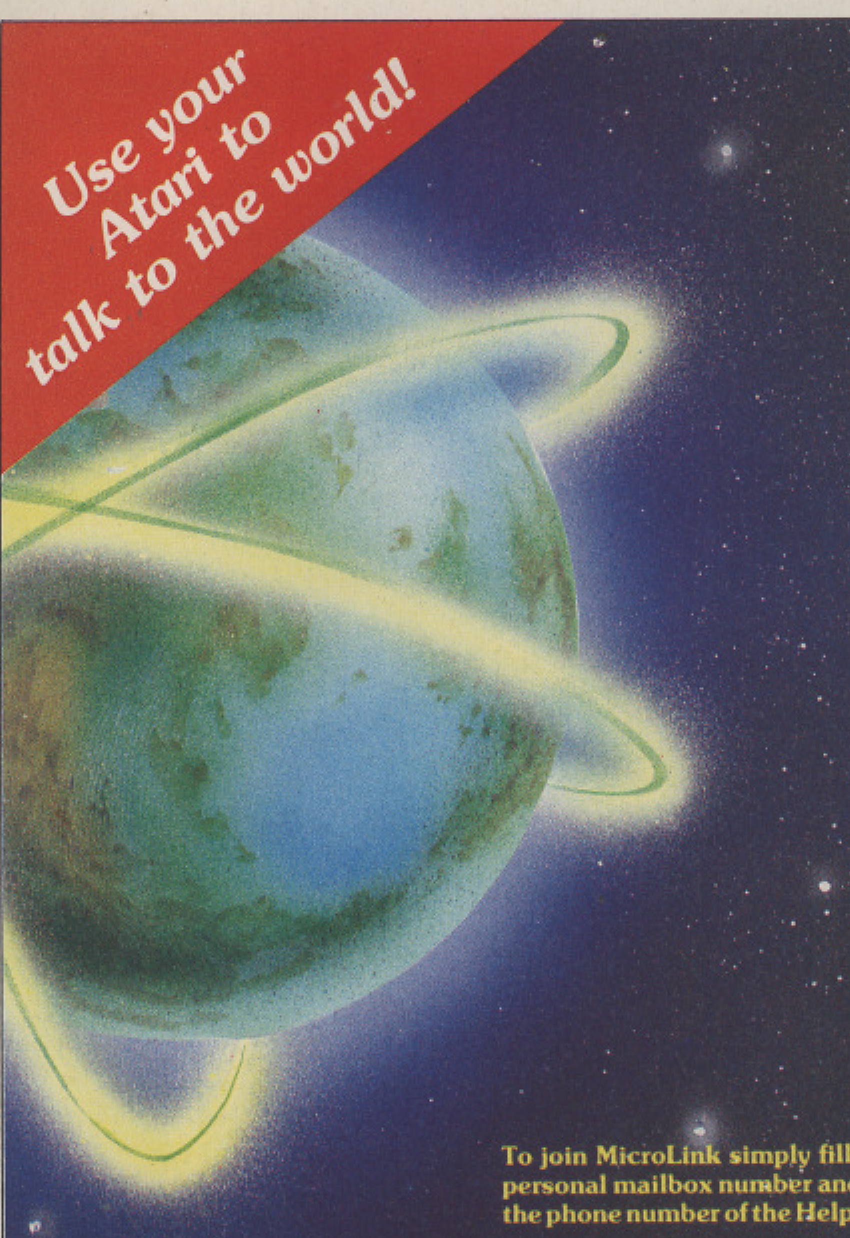
Subscription rates for 12 issues, post free:

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£18 – Europe
£30 – Overseas

"Atari User" welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accommpanied by cassette tape or disc. Please enclose stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Database Publications Ltd will be on an all-rights basis.

News trade distribution: Europress Sales and Distribution Limited, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

FULL and part-time writers are urgently needed by Database Publications, publishers of Atari User and its companion, Atari ST User. If YOU know the Atari or Atari ST inside out, can express your ideas on paper – and want to become part of the exciting future that lies ahead for Atari machines, then write now to: The Managing Editor, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. Please include your phone number.



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AT4

SOFTWARE SHAKE-UP

Atari promises much more support for programmers

AN Atari 8 bit software revolution has begun, prompted by a bridge-building exercise from the company to developers and the arrival of the video games machine, the 65XE.

Atari recently acknowledged its "inadequate support" for programmers in the past and vowed to get it right from now on.

And software houses are responding with more conversions to the 8-bit and a pledge of more new games on cassette and cartridge.

Included in the shake-up to give more support to third parties is the appointment of Roland Whitehouse as manager of software marketing. He explained: "My role is to give help and support for software generally, and especially for that about to be launched.

"We need, and are actively looking for, more cartridge-based software for the 65XE.

"The response has been excellent. Software houses are really cooperating. We know there was room for improvement and we feel we are turning the tide".

The company was approaching publishers about cooperative software advertising relating particular products to particular machines and everyone he had talked to was willing to help.

Atari told developers that it has set up a team of engineers to test software from developers, and is aiming to cater for the growing demand for better communication between Atari and authors.

A bulletin board has been set up to aid this.

Optimistic

Atari technical manager Les Player said: "As far as 8-bit computers and games consoles are concerned, we have revised our sales targets upwards and we are very optimistic about further multiple business.

"We hope this will motivate software companies to develop and market new titles for the 8-bit. This situation would be gratefully received by the existing base of extremely loyal users.

"Atari now offers an expanding market opportunity", he said.

Tynesoft is already impressed by the share of the market now being claimed by the 8-bit machines.

It began with a conversion of its hit Jet Set Willy and is continuing its move into the market with two more games.

Winter Olympics is a multi-load simulation combining five sports, each of which uses 60k of code, and Who Dares Wins II is a conversion of the popular combat and strategy game.

Tynesoft's head of development, Dave Croft said: "We feel that considering the price of the 8-bit micro and the share of the market it is now

→

A COVERSION of the Star Wars coin-op series is promised for the Atari 8 bit by the end of the year.

In something of a coup, Domark has secured the European rights to produce home computer versions of Star Wars itself, plus The Empire Strikes Back and Return of the Jedi.

Atari Inc, holders of the copyright on these games, granted Domark the rights through their licensing company, the International Development Group.

All the more for us...

A VERY warm welcome to the first exclusively 8-bit edition of Atari User. Now that our ST fledgling has flown the coop we will be devoting all of our pages to you, the Atari 8-bit owner.

From now on you'll be able to read even more of your favourite articles, type in more games listings and find out more facts than ever before.

We've been looking carefully through your comments on the magazine to date via the recent Reader Survey, and it is encouraging to see how many of you enjoy our balance of features. We've got lots of exciting plans for the coming months, including our second birthday in May, but for now we have no less than three great new features starting this issue. Look what we have to offer.

Two of our most popular writers, Len Golding and Stephen Williamson, present the first instalments of their new series – Len's long awaited tutorial on autobooting your Basic programs, and Steve's advanced character-set editor.

We also take you behind the scenes on the development of one of the most sought after arcade conversions of the year – US Gold's Gauntlet, the massive Atari arcade hit of 1986. In addition, Brillig's adventuring column has had a complete face lift and boasts a massive monthly adventure map.

All of our regular features are here as usual, of course, with not just one but two great games this month.

Len Golding's Gadgets column covers one of the most requested topics from the mailbag – that of how to construct your own printer interface to run a Centronics printer without spending a small fortune on the extra hardware.

André Willey will be continuing to look at the workings of the central input/output system, and this month considers how to add your own data handlers.

A final word on contributions. If you want to see your own work in Atari User *turn to Page 52 for some useful tips on how best to go about it.*

Atari 8-bit business booming – Sam Tramiel

A CLAIM that the Atari 8-bit range is coming back to life in a very big way was made by company president Sam Tramiel at the Hanover Show recently.

He singled out Atari's new 8-bit video games machine, the 65XE, as being the new flagship of the games machine range.

"We are particularly happy about the initial response, and now have the financial muscle to ensure that Atari becomes once again the leader in the 8-bit computer world", he said.

Atari is indeed in the best of financial health. The corporation's latest results show a remarkable turn around with sales up 82 per cent.

The major part of this came in the last quarter of 1986 when the company broke all records. In those three months they notched up sales of $92,667,000 against $65,350,000 for the same period in 1985.

The year's sales totalled just over $258 million against almost $142 million, an increase of 81.8 per cent. This left the net income for 1986 at about $23 million.

"We are now in a healthier financial position than Commodore ever was", said Jack Tramiel, the man who built Commodore into a billion dollar company and has now dragged Atari off its knees.

"Our strong performance in 1986 is the result of a resurgence in demand for video games systems and a growing consumer awareness of the value of the rest of our products.

"We are operating from a position of strength now. We are not only virtually debt-free, having paid off everybody, but we have $70 million in the bank", he said.

The introduction of the XE video game system and other major Atari products would drive the company's growth in 1987, said Tramiel.

Software shake-up

From Page 5

claiming, that it has to be a winner.

"We have therefore decided to support the machine. It seems the way to go.

"The demand for our Atari games has actually taken us by surprise".

And Mastertronic reports that it is increasing its range of 8-bit products.

"The Atari games we have published have done very well", said a spokesman. We feel happy continuing to support the 8-bit, especially with the arrival of the 65XE".

Pat Bitten of Mirrorsoft, which has published a conversion for the 8-bit, said that her company was talking to Atari about more games. The situation is "under consideration".

Code Masters' David Darling said conversions for the 8-bit had sold well. "We feel there is a good market in Britain for 8-bit games – and this can lead into the world market", he said.

Publishing drive

ATARI plans to get back into software publishing in a big way. The company believes that British software is equally as good as anything which can be produced in the US.

"We are looking for British programs which we can market around the world", a spokesman said. Star Trek with its digitised sound and impressive graphics was cited as a perfect example of homegrown programming.

Atari is also looking to market British-written business software.

Multiples move Atari's way

STAND by for an Atari explosion in the High Street this year. The company is at an advanced stage of discussions with several leading chains about putting its 8-bit and ST machines on their shelves.

Among the multiples Atari has targeted are W H Smith, Dixons, Boots, Laskys, Comet and Woolworths.

There are plans to test market the ST range at three of them in May and this will be followed by the games machines – the new 65XE, 2600VCS and ever-popular 130XE – in September.

Atari spokesman Peter Walker said the company is confident it can place its machines in the Big Six multiples, some of which handled its early 8 bit models.

"Negotiations are nearing completion but we don't want to jump the gun by announcing deals before they are fully signed, sealed and delivered", he told *Atari User*.

"The people we are dealing with are well aware that the ST range is a sure seller and that our 8-bit machines have no competition where software availability is concerned".

Don't miss this launchpad for all that's new in Atari computing

ATARI COMPUTER SHOW

10am-6pm Friday, April 24
10am-6pm Saturday, April 25
10am-4pm Sunday, April 26

Champagne Suite, Novotel, Hammersmith, London

MORE arcade games
MORE bargain offers
MORE business software
MORE graphics packages
MORE hardware add-ons
MORE utility programs
MORE adventures

On display for the first time in the UK will be new Atari products that are set to rock the micro world.

Star of the show will be Atari's IBM PC compatible, offering a radically new design at a price that will revolutionise the PC marketplace. There, too, will be the latest models in the ST range – the Mega ST workstations. Plus the remarkable Atari laser printer, the machine that has broken the price barrier in desktop publishing.

All of these – along with breakthroughs for the ever-popular 8-bit range and hundreds of new software packages – will be on display at the April Atari Computer Show.

Send for your advance tickets now – and SAVE £1 a head!

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Show features games arcade

A VEIL of secrecy hangs over Atari's plans for a play-it-yourself games arcade at the coming Atari Computer Show.

More than 20 machines running the latest 8 bit software will be available in the arcade, but the company is remaining tight-lipped as to which games visitors will be able to play.

"We'd like to keep the details under wraps until the last minute", said a spokesman.

Chosen as the UK launch pad for the company's new IBM PC compatible and Mega ST workstations the three-day show opens at London's Novotel in Hammersmith on April 24.

More than 70 exhibitors will be attending the exhibition and many will be unveiling new releases.

Three new games will be available from Red Rat Software – Asteroid, Death Racers and Forbidden Island – all costing £7.95 on tape, £9.95 on disc.

Tynesoft will be offering a range of budget titles on its new Micro Value label, all priced at less than a pound.

The Atari Computer Show takes place at the Novotel, Hammersmith, London from April 24 to 26.

Doors open at 10am each day and close at 6pm on Friday and Saturday, 4pm on Sunday.

A money-saving advance ticket order form can be found on page 7.



Atari games machines are go

Hard disc men fly in

AMERICA's leading supplier of hard disc drives for Atari machines is to jet over to London to exhibit at the April show.

The Supra Corporation is to share a stand with its UK distributor, Frontier Software of Harrogate, North Yorkshire.

It will mean that Atari users will get their first opportunity to see Supra's revolutionary 20Mb 8 bit hard disc.

Supplied with MyDos disc operating system, cables, power supply and interface unit, the drive plugs into the parallel bus at the rear of the 800XL and the 130XE.

Though priced at £799.95, this drive is likely to be much sought after by software writers and developers anxious to capitalise on the boom in the Atari 8 bit market.

Supra is well established in the United States, with its drives currently outselling their counterparts from Atari by a ratio of three to one.

All the drives supplied by Frontier will come with boot and utility programs and carry a 12 month guarantee.

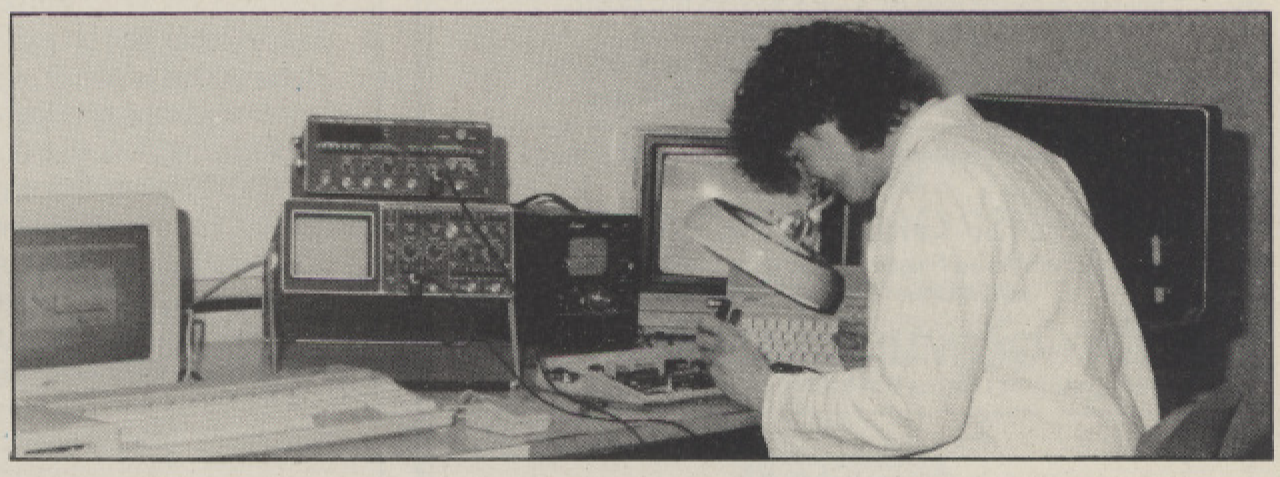
"The Supra range of hard discs bring previously unheard of speed and capacity to the Atari market", says Dave Fields, Frontier's sales manager.

"We are excited about bringing them into the country, where we're sure they'll prove as popular as they are in the States".

Prestel via MicroLink

ATARI comms enthusiasts may soon be able to access Prestel's massive 300,000 page database through MicroLink.

British Telecom is merging the messaging services of Prestel and Telecom Gold, with which MicroLink is associated. This will immediately create a 130,000-strong user base of micro owners able to exchange messages with each other.



Repair service launched

A REPAIR service for owners of 8 bit Atari machines has been launched by Heywood-based company Midcomm.

Offering a professional service and using the latest diagnostic and test equipment available, the company has already attracted customers worldwide.

Says managing director Ian Catherall: "We consider our company to be an extension of the good name of Atari and as such we offer the quality of service they would expect".

TORPEDO!

By GARY TINSLEY

"ENEMY boats on sonar Captain!"

"OK, Battle stations! Torpedo bay: Load torpedos . . . Up periscope . . ."



Enemy ships have finally invaded our territorial waters, and your mission is to sink as many as possible. You are armed with a large number of deadly high explosive torpedoes but your mission is limited by the length of time your air supply will let you stay submerged.

Can you score enough points to enable you to be awarded the rank of Admiral – or will you be thrown out of the Navy?

Type in the listing, and check it out with our Get It Right! checksum routine. When you're happy with it, SAVE a copy and then type RUN to start the game.

Press Select or move your joystick to choose between the three difficulty levels. The number on the sub will show the level number selected. Now press START or the joystick fire button to begin the game.

During the game you can press Start to quit, Option to pause and Select to return from pause mode.

An extra 40 points are added if a boat is destroyed in foggy conditions.

The "Air low" warning will sound to tell you when the game is nearly over, so hit as many boats as you can!

WHAT YOU SCORE	
Boat on the horizon:	25 points
Boat mid-sea:	15 points
Boats just off shore:	1 point

PROGRAM BREAKDOWN

Lines 40-200	Set up player missile graphics, create the boat shapes, clear sound registers, change each Graphics 0 line to mode 130 (ANTIC 2+128, for DLIs). The DLI routine and its colours are POKEd into Page 6. This routine first appeared in Analog magazine and it enables each screen line of ANTIC 2 mode (Graphics 0) to be a different colour, and the text a different luminance. Try changing some of the numbers in lines 133 & 134.
Lines 200-217	Print title screen, check for Start or fire button to be pressed – also check for joystick movement or Select to be pressed for level change.
Lines 230-239	Set air deterioration rate (LV), reset score and boats hit, choose random FOG duration, choose initial boat positions, zero numbers of boats hit.
Lines 240-280	Draw the game screen.
Lines 300-410	Main game loop – adjust air level ML, check for joystick movement and move submarine, move boats and check positions. If boats move off-screen then reset, check for fire button and if so fire torpedo. If ML reaches FOG then darken boat colours and set fog flag.
Lines 500-620	Test for a hit – check player collision registers (PEEK 53253 – 53255) and if any of these contain 4 then a torpedo has hit a boat. Add to score, set hi-score, set score, set boats hit (BT), set NB1 NB2 NB3, flash screen and make explosion noise.
Lines 700-715	Pause routine. Flash GAME HELD next to STATUS, check for Select to be pressed (for return), then loop back to line 70
Lines 800-891	End of game. Clear screen, disable DLIs (54286), print score, print number of boats hit and individual boats hit, print new rank, make sonar type noise, return to title screen.
Lines 900-930	Air low warning. Print Air low and continue with game.

```
10 REM ┌────────────┐
       │TORPEDO  by │
       │Gary Tinsley│
20 REM └────────────┘
30 REM SETUP
40 GRAPHICS 0:? " INITIALIZING PLEASE WAIT "
50 FOR X=0 TO 3:SOUND X,0,0,0:POKE 53248+X,1:NEXT X:POKE 53256,1
60 RT=PEEK(106)-8:POKE 559,46:MY=RT*256:POKE 53277,3:POKE 54279,RT
65 FOR X=MY+512 TO MY+1024:POKE X,0:NEXT X
70 FOR X=MY+607 TO MY+615:READ DA:POKE X,DA:NEXT X:DATA 24,60,126,126,126,255,255,255,255
80 FOR X=MY+682 TO MY+690:READ DA:POKE X,DA:NEXT X:DATA 0,0,8,28,62,60,0,0
90 FOR X=MY+832 TO MY+839:READ DA:POKE X,DA:NEXT X:DATA 0,0,20,62,127,62,0,0
95 FOR X=MY+978 TO MY+984:READ DA:POKE X,DA:NEXT X:DATA 0,16,56,40,47,255,127,0
100 POKE 704,6:POKE 705,24:POKE 706,25:POKE 707,220:POKE 752,1:POKE 709,14:POKE 710,114:POKE 712,112
109 RESTORE 130:POKE 53278,0
110 FOR X=0 TO 99:READ DA:POKE 1664+X,DA:NEXT X:POKE 512,128:POKE 513,6:DL=PEEK(560)+256*PEEK(561)
120 FOR X=DL+6 TO DL+28:POKE X,130:NEXT X:POKE DL+3,194
130 DATA 72,138,72,174,156,6,189,176,6,141,10,212,141,24,208,189,200,6,141,23
131 DATA 208,238,156,6,104,170,104,64,20,104,169,7,160,168,162,6,32,92,228,96
132 DATA 169,1,141,156,6,76,98,228,244,24,118,118,118,118,118,0,112,112,114,114
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

```
133 DATA 116,116,118,118,120,120,122,122,124,124,24,244,12,0,14,14,14,14,14,6
134 DATA 6,6,8,8,8,8,10,10,10,10,12,12,14,14,0,12,0,0,0,0
200 LV=1:POKE 709,14:POKE 710,114:POKE 712,112:? "K":? :? :? :? " ██████"
201 ? "   █ ┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐┌─┐"
202 ? "   █ │ │└─┘└─┘└─ │ ││ │▐"
203 ? "   █ │ ││││ │   │ │ ││ │▐"
204 ? "   █ └─┘│││ │   └─┘└─┘└─┘"
205 ? "   █":? "              B Y":? :? "         GARY TINSLEY"
206 ? :POSITION 27,14:? "┐":POSITION 26,15:? "||":POSITION 26,16:? "██"
207 ? "▄ ▟                                ◢█"
208 ? "██████                   ◢████1████◤/▙"
209 ? " PRESS                    ◥████████◤\▛"
210 ? " START  ▪ ▪   ▬▬▬▬▬▬ ▪  ▪ ▪▬▬ ▬▬▬▬  "
211 ? "          SCORE :        HI-SCORE:        ":POSITION 18,21:? SC:POSITION 32,21:? HSC
212 FOR L=19 TO 0 STEP -0.3:SOUND 0,2,8,L/2:POSITION 10,19:? " "
213 IF L>10 THEN POSITION L,19:? "▬ ":POSITION 3,19:? "     ":POSITION 3,20:? "     "
214 IF L<10 THEN POSITION 3,19:? "PRESS":POSITION 3,20:? "START"
215 IF PEEK(53279)=6 OR STRIG(0)=0 THEN ? LV:GOTO 230
216 POSITION 26,18:? INT(LV):IF PEEK(53279)=5 OR STICK(0)<>15 THEN LV=LV+0.2:IF LV<1 OR LV>3.4 THEN LV=1
217 NEXT L:GOTO 212
230 IF INT(LV)=1 THEN LV=30
231 IF INT(LV)=2 THEN LV=20
232 IF INT(LV)=3 THEN LV=10
233 BT=0:SC=0:FL=0:? "K":POKE 710,PEEK
```


ATARI USER MAIL ORDER OFFERS




```
(1712):POKE 709,PEEK(1736):X=USR(1693)
:POKE 54286,192
235 SX=INT(RND(0)*100+50):FOG=INT(RND(
0)*16+20):FOG1=FOG-INT(RND(0)*15+1)
236 B1=INT(RND(0)*100+50):B2=INT(RND(0
)*70+70):B3=INT(RND(0)*80+80)
237 W=INT(RND(0)*1+1):IF W=1 THEN WW=4
238 IF W=2 THEN WW=-4
239 NB1=0:NB2=0:NB3=0
240 POSITION 0,0:? " AIR: E ==========
------------------ F TORPEDO READY  -
 NO FOG - AIR O.K.   "
250 POSITION 0,22:? " SCORE:0       BOA
TS:0   HI-SCORE:0   "
260 POSITION 0,23:? " TORPEDO BY G.TIN
SLEY   STATUS: GAME  ↑↑↑"
270 POSITION 2,3:? "▄█▄":POSITION 3,4
:? "▔▀▔"
275 POSITION 23,4:? "▄█":POSITION 24,
5:? "▀▀"
280 POSITION 34,3:? "▄█▄":POSITION 34
,4:? "████":POSITION 35,5:? "▔▀▔":SOU
ND 0,2,0,2
300 REM  MAIN LOOP 
310 FOR ML=36 TO 8 STEP -1:FOR SL=0 TO
 LV
320 IF STICK(0)=11 THEN SX=SX-3:IF SX<
50 THEN SX=190
321 IF STICK(0)=7 THEN SX=SX+3:IF SX>1
90 THEN SX=50
325 POKE 53248,SX:POKE 53249,B1:POKE 5
3250,B2:POKE 53251,B3:POKE 77,0
330 B1=B1+2:B2=B2+WW:B3=B3-4:IF B1>198
 THEN B1=52
332 IF B3<52 THEN B3=198
334 IF B2<90 THEN WW=4
335 IF B2>150 THEN WW=-4
340 IF FL=0 AND STRIG(0)=0 THEN FL=1:T
X=INT(SX-42)/4:TX1=SX:TY=19:GOSUB 500
350 IF FL=1 THEN GOSUB 500
355 IF PEEK(53279)=3 THEN GOSUB 700
357 IF PEEK(53279)=6 THEN GOTO 800
360 NEXT SL
370 IF ML=FOG THEN POKE 705,4:POKE 706
,2:POKE 707,10:F=1:POSITION 19,1:? " F
OG  "
380 IF ML=FOG1 THEN POKE 705,24:POKE 7
06,25:POKE 707,220:F=0:POSITION 19,1:?
 "NO FOG"
390 POSITION ML,0:? " "
395 IF ML=14 THEN GOSUB 900
400 NEXT ML
410 GOTO 800
500 REM  HIT BOAT ? 
505 IF PEEK(53253)=4 OR PEEK(53254)=4
OR PEEK(53255)=4 THEN 550
510 TY=TY-1:IF TY<7 THEN FL=0:POSITION
 TX,7:? " ":POSITION 1,1:? "TORPEDO RE
ADY  ":RETURN
520 POSITION TX,TY:? "|":POSITION TX,T
Y+1:? " ":POSITION 1,1:? "LOADING TORP
EDO":SOUND 0,2,0,TY/2-2:RETURN
550 FOR L=0 TO 3:SOUND L,0,0,0:NEXT L:
SOUND 1,2,0,2:BT=BT+1:POSITION TX,TY:?
 " "
560 IF PEEK(53253)=4 THEN SC=SC+25:POK
E 53249,1:NB1=NB1+1
565 IF PEEK(53254)=4 THEN SC=SC+15:POK
E 53250,1:NB2=NB2+1
570 IF PEEK(53255)=4 THEN SC=SC+1:POKE
 53251,1:NB3=NB3+1
580 IF F=1 THEN SC=SC+40
590 IF SC>HSC THEN HSC=SC
591 POSITION 33,22:? HSC;"↑↑↑":POSITIO
N 7,22:? SC:POSITION 20,22:? BT;"↑↑"
600 FOR X=1 TO 10:POKE 54286,64:POKE 7
10,50:SOUND 1,60,8,14:SOUND 2,90,8,14:
FOR X1=1 TO 10:NEXT X1
605 POKE 54286,192:POKE 710,244:SOUND
1,60,8,6:SOUND 2,90,8,6:FOR X1=1 TO 10
:NEXT X1:NEXT X
607 POSITION 1,1:? "TORPEDO READY  "
610 FOR X=8 TO 0 STEP -0.1:SOUND 1,60,
8,L:IF L<2 THEN SOUND 2,90,8,L-2
615 NEXT X:FOR X=1 TO 3:FOR X1=125 TO
75 STEP -2:SOUND 1,X1,10,14:NEXT X1:NE
XT X
620 FOR X=0 TO 3:SOUND X,0,0,0:NEXT X:
SOUND 1,2,0,2:FL=0:POKE 53278,0:RETURN
700 REM  HOLD 
705 POSITION 31,23:? " GAME ↑↑":FOR X=
1 TO 50:NEXT X
710 POSITION 31,23:? " HELD ↑↑":FOR X=
1 TO 50:IF PEEK(53279)=5 THEN POSITION
 31,23:? " GAME ↑↑↑":RETURN
715 NEXT X:GOTO 705
800 REM  END OF GAME 
810 FOR X=0 TO 3:SOUND X,0,0,0:POKE 53
248+X,0:NEXT X:? "K":POKE 54286,64:POK
E 710,192:POKE 712,192
820 POSITION 2,0:? "────── GAME OVER ─
─ TORPEDO ──────"
830 POSITION 5,3:? "You have scored ";
SC;" points ":POSITION 11,5:? "You hit
 ";BT;" boats"
835 FOR X=1 TO 3:POKE 53248+X,110:NEXT
 X:POSITION 18,7:? "x ";NB1
836 POSITION 18,12:? "x ";NB2:POSITION
 18,17:? "x ";NB3
840 POSITION 2,20:? "   Your score giv
es you a rank of":?
850 IF SC>490 THEN ? ,"ADMIRAL"
855 IF SC>350 AND SC<491 THEN ? ,"CAPT
AIN"
860 IF SC>250 AND SC<351 THEN ? ,"CREW
 MAN"
865 IF SC>150 AND SC<251 THEN ? ,"DECK
 CLEANER"
866 IF SC>100 AND SC<152 THEN ? ,"SUBM
ARINE COOK"
870 IF SC<101 THEN ? "NONE - HAVE YOU
EVER TRIED THE ARMY ?"
890 FOR X1=0 TO 2:FOR X=15 TO 0 STEP -
0.2:SOUND 0,90+RND(0)*3,10,X:NEXT X
891 NEXT X1:POKE 53249,0:POKE 53250,0:
POKE 53251,0:NB1=0:NB2=0:NB3=0:GOTO 20
0
900 REM  AIR LOW 
910 FOR X=1 TO 3:POSITION 27,1:? "
      ":SOUND 0,80,10,14:FOR X1=1 TO 20
:NEXT X1
920 POSITION 27,1:? " AIR LOW":SOUND 0
,60,10,14:FOR X1=1 TO 20:NEXT X1:NEXT
X:SOUND 0,0,0,0
930 RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	30369	20	6659	30	4485
40	8208	50	10927	60	11673
65	7402	70	15073	80	12807
90	13145	95	13628	100	16564
109	4534	110	16890	120	9355
130	11151	131	11127	132	11385
133	10954	134	7939	200	13146
201	9190	202	6870	203	5520
204	5526	205	8258	206	12662
207	4192	208	9048	209	11298
210	7322	211	27445	212	10128
213	17376	214	15166	215	9144
216	18593	217	3037	230	4344
231	4344	232	4344	233	15823
235	12406	236	10783	237	6603
238	3315	239	3089	240	15792
250	9385	260	10856	270	8004
275	7829	280	16319	300	7071
310	7082	320	9338	321	8941
325	11587	330	7909	332	3331
334	3098	335	3689	340	13367
350	3903	355	5475	357	5333
360	1593	370	14140	380	14781
390	3435	395	4151	400	1581
410	1622	500	7028	505	10326
510	17006	520	20085	550	14073
560	9397	565	9384	570	9329
580	3713	590	4302	591	12531
600	16719	605	15886	607	6202
610	11844	615	14406	620	13336
700	4008	705	10384	710	19396
715	3079	800	7550	810	16872
820	15816	830	18850	835	10989
836	9499	840	12703	850	4881
855	6806	860	7083	865	7701
866	8402	870	10344	890	12193
891	13210	900	5563	910	13787
920	15694	930	1498		

Just like the real thing

START OF A NEW SERIES

LEN GOLDING shows you how to give your programs that professional touch

OVER the next three months we'll be explaining how to make your Basic and machine code programs load and run automatically, just like commercial machine code software. We'll start by examining cassette systems, then move on to the various disc techniques.

The most obvious reason for using autoboot files is cosmetic – programs look more professional if they load and run automatically – but they have many other advantages which are less apparent.

You can change the screen colour, alter the margins, set new Tab stops, select lower case letters or insert a flashing cursor, all before the READY prompt appears.

You can load new character sets, ready-drawn screen images, or other large blocks of data before Basic takes control. And the autoboot system is the only way of changing MEMLO, which tells Basic where to find its lowest useable memory.

Re-setting this pointer to a higher value will cordon off an area at the low end of ram which Basic can't touch, and which will be in the same place regardless of the host computer's memory size.

The bad news is that autoboot files must be written in machine code. The entire load and run process happens before Basic gets control, so there's no direct way of autobooting a Basic program. However, it is possible to make a machine code file which initialises Basic then calls and runs a Basic program, and the end result is hard to distinguish from a single-stage autoboot operation. We will be giving you several suitable programs as we go along.

The easiest way of explaining how an autoboot file works is to construct one. Program I contains the simplest we can think of – it just changes the screen border to the same colour as the text area and resets MEMLO to protect itself from Basic.

You will need some kind of assembler, such as the Atari Assembler/Editor cartridge, to make it work in this form, of course. Although it's short, it embodies all the features of a cassette autoboot file, so if you can make this work then there's nothing to stop you writing much more interesting routines.

Let's look at the format step by step. The first six bytes (lines 80 to 110) are a header, containing information which the operating system needs to carry out the autoboot process.

The first byte is always zero, though it isn't used by the OS. The second is the file length, in blocks of 128 bytes, rounded up if necessary.

Next comes a two-byte address which tells the OS where in ram it has to start loading the file.

Finally the last two bytes hold the initialisation address. Control will pass to this address during power-up, and whenever System Reset is pressed. The rest of the file, from COLDST to FINISH, contains all the machine code instructions which we want carried out before Basic gets control.

Here's how the cassette autoboot system works. When you switch the power on with the Start key held down a single beep tells you to press Play on your cassette recorder, then hit any key. The computer begins by reading the first 128 byte record from tape into the cassette buffer starting at 1021 ($3FD).

It extracts the information from the first six bytes, stores the load address in BOOTAD 578/9 ($242/3), stores the initialisation address in CASINI (2/3) and makes a note that it's using a cassette-based program by storing 2 in the BOOT? flag (address 9).

It then copies the entire first record (including the header) from the cassette buffer to the load address and works out how many more blocks are needed, then loads them directly from tape to the load area.

When loading is complete, the OS performs a sequence of jumps to various subroutines. First it does a JSR to BOOTAD+6 straight after the header. Because it's a JSR, not a JMP, this section of code must end with an RTS instruction (line 170).

When it returns via the RTS statement the OS checks the 6502 carry flag. If it's set, the autoboot process terminates with an error message, but if it's clear the process can go on to stage two.

This first section must always switch off the cassette motor, clear the carry flag (with a CLC command) and

```
05 ;PROGRAM 1 - A SIMPLE CASSETTE AUTOBOOT FILE
10 COLOR4=$2C8
20 LOADADR=$700      Lowest possible address for cassette files
30 MEMLO=$2E7
40 PACTL=$D302
50  *=LOADADR
60 ;
70 HEADER
80  .BYTE 0                        Not used
90  .BYTE FINISH-LOADADR+127/128   Number of 128-byte blocks
0100  .WORD LOADADR                Address to start load
0110  .WORD INIT                   Initialisaton address
0120 ;
0130 COLDST
0140  LDA #$3C                     Turn off cassette motor
0150  STA PACTL
0160  CLC                          Indicate success
0170  RTS
0180 ;
0190 INIT
0200  LDA #148                     Change screen
0210  STA COLOR4                   border colour
0220  LDA #FINISH&255              Set MEMLO to protect
0230  STA MEMLO                    the autoboot file from
0240  LDA #FINISH/256              destruction by Basic
0250  STA MEMLO+1
0260  RTS                          Exit to Basic
0270 ;
0280 FINISH=*
```

Program I

return via an RTS.

The second jump is another JSR, this time to the initialisation address, copied from the header and now held in CASINI. In Program I, intitialisation starts at INIT, and this is where we change the screen border colour, starting with the instruction LDA #148.

Any code between the initialisation address and its RTS instruction will be executed not only during power up but also whenever System Reset is pressed.

If you want to alter any system pointers, such as MEMLO, you must do it here, otherwise pressing Reset will wipe out all your new values. This "initialisation" section must always exit with an RTS instruction.

The final stage of the boot load depends on whether or not a cartridge is waiting to take control. If so, the OS simply does a JMP to the cartridge start address, usually 40960 ($A000). With Basic installed this produces the familiar READY message.

If no cartridge is present, or if it's a peculiar type that doesn't want to run, the OS will do a JMP to the address contained in a pointer called DOSVEC at 10/11 ($A/B).

During power up the OS sets this to point to the "blackboard" routine – memo pad mode on 400/800 computers, or self-test mode on XL/XE models.

If your autoboot file is a self-contained machine code game, or other program which doesn't need support from a language cartridge, you should change DOSVEC to point to the start of your main code. This may be accomplished during either the stage one or stage two machine code segments.

One way of doing this would be to add the following lines before the final RTS in Program I:

```
LDA #MAINCODE&255
STA DOSVEC
LDA #MAINCODE/256
STA DOSVEC+1
```

Insert your main program between the final RTS and the label FINISH, and begin it with the label MAINCODE. So long as no cartridge is installed, (and internal Basic is switched off) the final JMP will now pass control to your machine code program instead of to the blackboard routine.

The OS will repeat steps two and three whenever System Reset is pressed, which means that you could write an entirely new reset routine and the user would never even know about it. We'll show you how to take advantage of this later on.

Now that we know what an autoboot file looks like and how it works, we still have to get it on to tape somehow. This isn't as simple as it sounds, because autoboot files must be saved in binary form, with short inter-record gaps.

No instruction in the repertoire of Basic or the Assembler/Editor cartridge will produce the correct format automatically, so we need a special routine to do it for us.

Program II is the one to use if you're working in assembly language. The code up to line 490 is the new save routine. It calls CIO directly to write all the data from HEADER to FINISH directly on to tape. It is important to keep this code separate from the data you want written to tape, so we've put it out of the way in page 6.

The rest of Program II is a duplicate

→

```
05 ;PROGRAM 2 - PROGRAM 1 WITH AN ADDITIONAL ROUTINE FOR SAVING TO CASSETTE
10 ;Creates an autoboot cassette file from the code between LOADADR and FINISH
20 ;
30 COLOR4=$2C8
40 EOL=$9B
50 PACTL=$D302
60 LOADADR=$700
70 MEMLO=$2E7
80 ;
90 ;Start by putting the SAVER routine into page 6.
0100 ;
0110  *=$600
0120 ;
0130 SAVER
0140  LDX #$10                     Open channel 1 for output
0150  LDA #$03
0160  STA $352
0170  LDA #$08
0180  STA $35A
0190  LDA #$80                     Short IRG mode
0200  STA $35B
0210  LDA #CFILE&255               Point to file name (C:)
0220  STA $354
0230  LDA #CFILE/256
0240  STA $355
0250  JSR $E456                    Call CIO
0260 ;
0270 ;Now write the entire file to cassette
0280 ;
0290  LDX #$10                     Use channel 1
0300  LDA #$0B
0310  STA $352
0320  LDA #LOADADR&255             Get start address
0330  STA $354
0340  LDA #LOADADR/256
0350  STA $355
0360  LDA #FINISH-LOADADR&255      Number of bytes
0370  STA $358
0380  LDA #FINISH-LOADADR/256
0390  STA $359
0400  JSR $E456                    Call CIO
0410 ;
0420  LDX #$10                     Close channel 1
0430  LDA #$0C
0440  STA $352
0450  JSR $E456                    Call CIO
0460  BRK
0470 ;
0480 CFILE
0490  .BYTE "C:",EOL
0500 ;
0510 ;Code to be made into an Autoboot file starts here:
0520 ;
0530  *=LOADADR
0540 ;
0550 HEADER
0560  .BYTE 0                          Not used
0570  .BYTE FINISH-LOADADR+127/128     Number of 128-byte blocks
0580  .WORD LOADADR                    Address to start load
0590  .WORD INIT                       Initialisation address
0600 ;
0610 COLDST
0620  LDA #$3C                         Turn off cassette motor
0630  STA PACTL
0640  CLC                              Indicate success
0650  RTS
0660 ;
0670 INIT
0680  LDA #148                         Change screen
0690  STA COLOR4                       border colour
0700  LDA #FINISH&255                  Set MEMLO to protect
0710  STA MEMLO                        the autobbot file from
0720  LDA #FINISH/256                  destruction by Basic
0730  STA MEMLO+1
0740  RTS                              Exit to Basic
0750 ;
0760 F
```

Program II

of Program I. When you have typed everything in, assemble it then enter DEBUG mode and type G 600 to run the machine code at address $600. Set the tape to record and press the Return key and the data will be written to the tape in the correct autoboot format.

If you don't have an assembler, Program III will do virtually the same thing. As the DATA statements contain machine code they must be absolutely correct or your computer will probably lock up – so make sure you save a copy before you try running this program.

Type RUN to start things off, then follow the same procedure. Only the code at lines 150 and 160 will be written to the cassette file. We'll be using this program again next month, so keep a copy safely.

To load the resulting file, switch off the computer, rewind the tape and switch on again, holding down START (but not Option). Press Play when the beep sounds and hit any key. After the usual leader delay, you'll hear the autoboot file being loaded, then if all is well the screen colour will change before READY is printed.

As an experiment, try changing the border colour back to its default value by POKE 712,0. Now press System Reset, and you'll see the new colour is restored as the OS performs its JSR through CASINI.

● *Next month we'll be explaining how to make your own Basic programs into autoboot cassette files.*

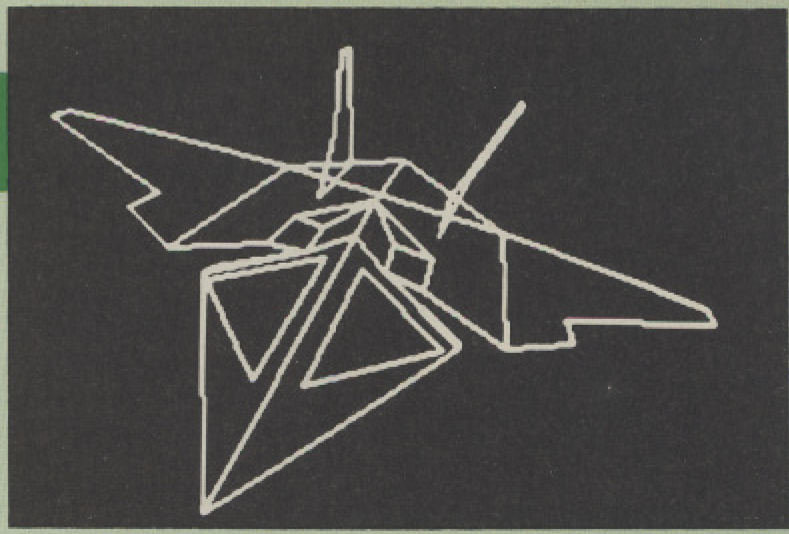
```
5 REM PROGRAM 3 - BASIC version of Pro
gram 2
10 REM Writes the data at line 150 int
o an autoboot cassette file.
20 BFR=(PEEK(106)-24)*256:REM reserve
a safe area at the top of RAM as a tem
porary buffer
30 FOR X=0 TO 46:READ D:POKE 1536+X,D:
NEXT X:REM Load the new SAVE routine i
nto page 6
40 DATA 104,104,133,204,104,133,203,10
4,133,206,104,133,205,162,16,169,11,15
7,66,3
50 DATA 165,203,157,68,3,165,204,157,6
9,3,165,205,157,72,3,165,206,157,73,3
60 DATA 32,86,228,96,67,58,155
70 REM Load the program temporarily in
to the reserved buffer space
80 X=0:RESTORE 150
90 READ D:IF D=-1 THEN 120
100 POKE BFR+X,D:X=X+1:GOTO 90
110 REM Now read the data from the tem
porary buffer into an Autoboot cassett
e file
120 OPEN #1,8,128,"C:"
130 X=USR(1536,BFR,PEEK(BFR+1)*128)
140 END
150 DATA 0,1,0,7,13,7,169,60,141,2,211
,24,96,169,148,141,200,2,169,29
160 DATA 141,231,2,169,7,141,232,2,96,
-1
```

Program III

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
5	9637	10	16793	20	21121
30	18348	40	12019	50	10982
60	4362	70	17536	80	2898
90	4317	100	5005	110	21671
120	3015	130	5780	140	836
150	9872	160	5551		

Crafty plotter



Program: Super 3D Plotter II
Price: £29.95 (disc only)
Supplier: Demon Software, 91 Fleetwood Avenue, Westcliff, Essex SS0 9RE.
Tel: 0702 333007

EVER since I bought my first computer I've always regarded the prospect of 3D imaging on-screen – with the opportunity to rotate the image in any directon and dump it down to printer – as being well beyond my programming capabilities.

Well, with Super 3D Plotter II, I can not only do just that but much more at a fraction of the time and cost it would have taken me.

Disc based, the program auto-boots without Basic. It can display complex drawings in low, medium and high resolutions. Menu driven, the first options enable you to Load or Create.

Luckily the program has plenty of images stored on disc. Until you get used to the complex array of instructions for creating your image, the best way to see what Super 3D Plotter II can do is to load an existing image. Having made your choice another three options are engaged: Display, Edit and Save current image.

Images are loaded into memory in medium resolution mode and can be changed to either low or high resolution at the touch of a button.

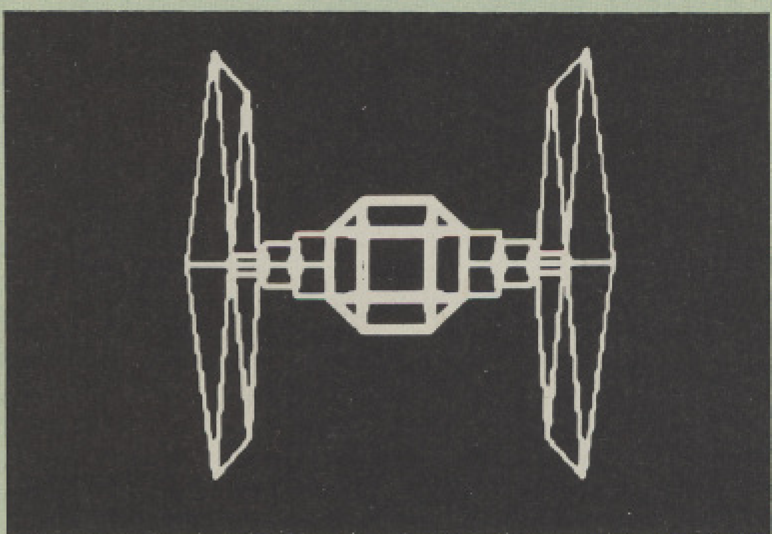
The main feature of Super 3D Plotter II is its ability to rotate in any direction. Using a combination of keystrokes, left to right movement can be combined with up and down direction to achieve a really impressive display of bit-mapped graphics.

Each time the image moves all the lines that make up the display change position so as to give the impression of basic animation.

The speed at which your display rotates can be altered and at any time you can freeze the image to take a closer look at the display or dump the screen to printer.

Any image can be viewed in a range of perspectives by using the freeze button selectively, thus allowing the image to continue moving in one direction – say left to right while the up/down movement is frozen.

If you want to get closer to the image, just hit the magnify button until you achieve the desired result. Your image can also be enlarged/reduced and kept in true perspective at the same time.



You can produce hard copies at any time providing you set up the printer control before loading up the main program.

Super 3D Plotter II is automatically configured for Epson and compatibles only, although by adapting the printer configuration file it should work for the 1029 Dot Matrix printer. More comprehensive dumps can be obtained by displaying the image in hi-res mode.

Other useful facilities are screen save, which will save the entire screen in a 62-sector MicroPainter format called Picture.

And if you really want to get creative, you can overlay a screen.

Just think of it – your favourite picture as a background with your 3D image displayed as the foreground.

Further designs can be achieved by image trailing: Instead of lines being erased and redrawn when your image is moving, you can alter the functions to leave old lines on the screen and still have the computer draw new ones.

Creating images is somewhat harder than controlling a screen display, but a tutorial is written into the manual which eases you into the intricacies of creating your own masterpieces.

There are two methods of data input: The Interactive Graphic Editor lets you use the joystick to define and position coordinates, draw connecting lines and link the whole image into a 3D drawing.

The safest way to plot your designs is to use the old-fashioned system of pencil and graph paper, then either type in the coordinates or move the joystick around the screen until you reach the desired position.

The other method of data input is the Image Data Editor – all the commands are entered from the keyboard. In some respects this method can be easier to use once you understand the philosophy of 3D design.

Whichever method you use there are plenty of commands available to edit and retry positions before saving the image to disc.

Using the joystick input routine I entered the coordinates for the cube image tutorial and within 10 minutes had the design rotating around the screen.

I was surprised at the ease of constructing an image, although the more complex the design, the greater the need to use graph paper and pencil.

The manual is 56 A5 pages printed on yellow paper – an extremely important part of the package. You also get an A5 Help card which outlines the function of each key. All this is packaged in a sturdy plastic box.

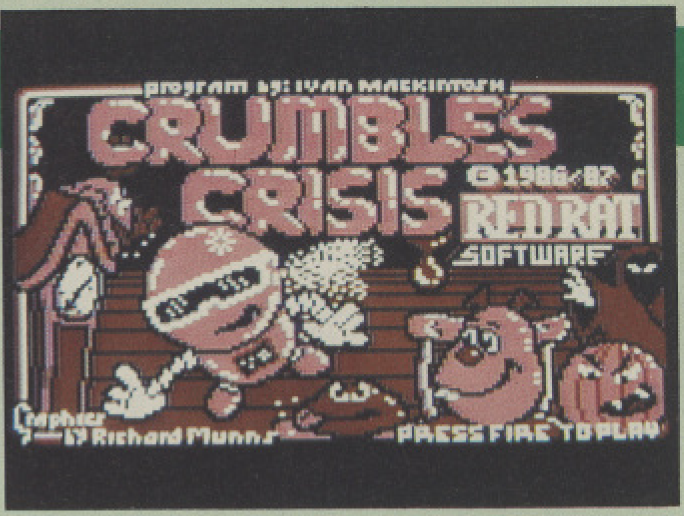
In conclusion, I was surprised that such complex images could be so easily produced. The author has obviously put an immense amount of time and effort into this and should be congratulated.

Whether you're a budding graphic artist or just a plain doodler this program wouldn't go amiss in anybody's collection.

Alan Goldsbro

Presentation	*6*
Graphics	*10*
Ease of use	*8*
Value for money	*9*
Overall	*8*

Fuzzy problems



Program: Crumble's Crisis
Price: £7.95 (cassette) £9.95 (disc)
Supplier: Red Rat, 11-15 Fennel Street, Manchester M4 3DU.
Tel: 061-835 1055

THE Director of the Intergalactic Zoo is rather less than pleased with you, Crumble. It seems that you were in charge of closing the zoo last night – and you didn't set the time locks on the Fuzzies' cages properly.

During the night they all escaped into the depths of the Multiverse and you are going to have to track down and recapture them.

To help you get around you'll have a jet-pack – just press the joystick button to fly. That's all you'll need, oh, and a steady hand and a modicum of coordination – these Fuzzies can get into some pretty awkward corners.

Altogether 30 Fuzzies have escaped and you should find six in each of the five levels of the Multiverse. Just go up to them and pop them into your cage, they shouldn't struggle.

You'll be able to see through the bars of the cage how many of the perishers you've caught, so even you won't lose count.

You can always tell a Fuzzy by its inane grin and chortling shoulders, rather like a cross between Dick Dastardly's Muttley and Edward Heath. They aren't actually vicious, but they are rather devious and cunning, so watch your step.

No shirking now Crumble. Time Lightning starts sparking all over the place if you loiter for too long, so don't get waylaid by some of the rather pretty locations.

If you find you're getting tired, just look for the Energy Packs. One rather important tip, don't touch the walls or ceilings. They're composed of anti-matter and it's pretty bad news if you come into contact with that stuff.

Oh, before you go, you know I said the Fuzzies were basically harmless? Well, there are some rather more unfriendly creatures around, ghosts, goblins, evil weevals and such like. Keep your eyes peeled and don't try catching any for the Director will you?

Right, that's about the lot. It should be enough to keep you busy for a good while, so I don't want to see you again until all 30 Fuzzies are back under lock and key.

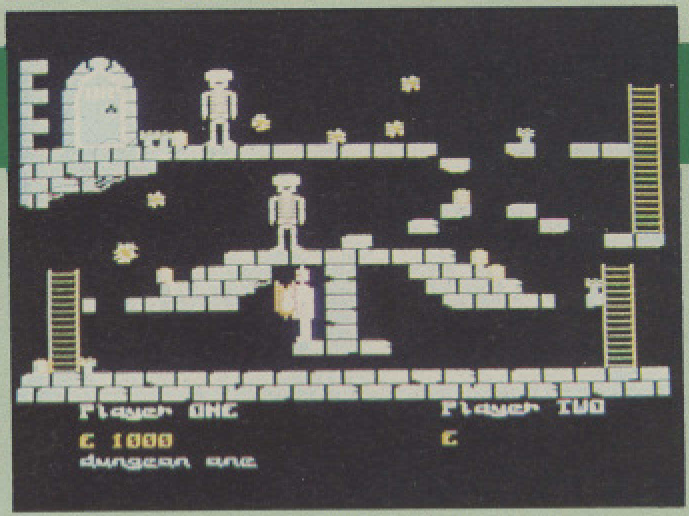
Stop complaining Crumble, all that running about through the levels of the Multiverse seems pretty good fun to me – if you don't pop your clogs along the way that is.

More fun than I'm going to have anyway – I've been lumbered with mucking out the Megapotamus' cage while you're away!

Niels Reynolds

Sound	*7*
Graphics	*8*
Playability	*9*
Value for money	*8*
Overall	*8*

Platform for two



Program: Robot Knight
Price: £7.95 (cassette), £9.95 (disc)
Supplier: Red Rat, 11-15 Fennel Street, Manchester M4 3DU.
Tel: 061-835 1055

AS an introduction to Robot Knight you are given a history lesson to explain the task ahead – quite good reading it makes too.

The villain of the piece is Otto. Living in a serene and easy-living Futureworld, he constructed his evil plans for world domination. His plot, however, was uncovered and he was thrown in prison. But it wasn't long before he hatched an escape plan.

Feeling bitter and twisted that his penchant for famine, disease and poverty wasn't appreciated in Futureworld, he resolved to go back to a time where these qualities were a daily fact of life.

This was not Maggie's Britain in the late 20th century, but Europe in the 13th.

Finding an isolated chateau, he built a laboratory in which to perfect the ultimate being, to unleash it on an unsuspecting Futureworld.

So far he's met with only limited success and zombie-like rejects roam the lower reaches of the chateau, deterring all but the most hardy of double glazing salesmen. It is your task to find Otto and destroy him before he perfects the final monster.

You materialise in the chateau and must battle through various dungeons and chambers, past the skeletal zombies and their fireballs, collecting energy packs on the way.

The ultimate goal is Otto's laboratory, where the monster is about to awake.

Essentially a platform game, Robot Knight has a feature which makes the game much more interesting. When starting you have a choice of two knights.

Either knight can be used in a one-player game. In a two-player game both are used simultaneously and you can choose to act as allies or enemies.

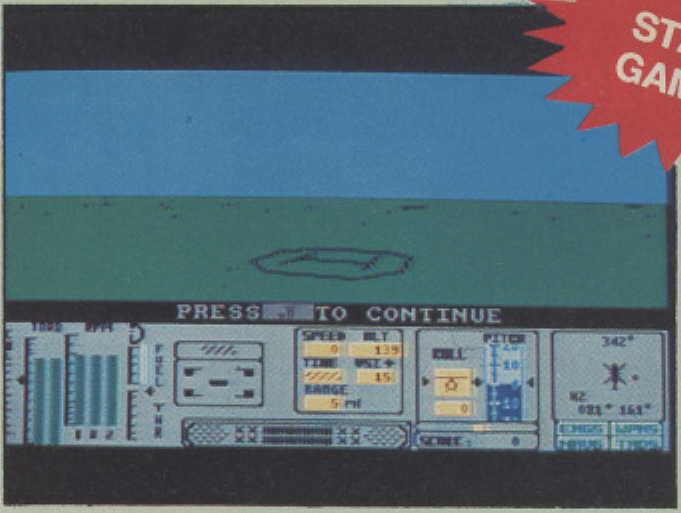
It is the rather fun two-player option that lifts Robot Knight out from being just another platform game. If you play your computer games with a friend this would be a good buy. If not, I'm sure it's still sufficiently tricky to appeal to some.

Niels Reynolds

Sound	*6*
Graphics	*7*
Playability	*8*
Value for money	*8*
Overall	*8*

STAR GAME

Real high flyer



Program: Tomahawk
Price: £6.95 (cassette), £14.95 (disc), minimum 64k
Supplier: Digital Integration, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ.
Tel: 0276 684959

FLIGHT simulators for home computers just can't compare with the real thing, but they can give you some of the flavour, and Tomahawk excels at that.

In fact I am constantly amazed at just how much can be crammed into a 64k, 8 bit computer – regardless of make.

On the Atari, Tomahawk scores very highly. I have read how Tomahawk is jerky and unresponsive on other micros, but I found no such problems with this version.

Tomahawk's presentation immediately reminded me of Digital Integration's other flight simulator, Fighter Pilot. However, while that is strictly an air-to-air fixed-wing simulation for the F15 Eagle, Tomahawk is a simulation of the Mcdonnell Douglas (Hughes) AH-64A Apache Advanced Attack Helicopter.

As such, it includes both air-to-air and ground attack combat simulations.

Although there is no music, sound effects add to the feeling of realism without being too harsh. They include the launching of missiles and gunfire, explosions, engine and rotor whoosh.

The rotor sounds really stand out when the chopper is at rest, after turning off the engines.

You control the machine using a combination of joystick and keyboard input – an optional second joystick doubling as the rudder and collective lever.

Flying, it seems, is relatively straightforward. Pushing forward on the stick both increases speed and reduces the altitude depending on how much angle of attack you have set on the rotors, via the collective lever.

You pull back the stick to gain height and reduce speed, and the automatic stablilisers return you to level flight.

Landing is achieved by reducing lift and pulling back on the stick. You can land with up to 50 knots of forward speed and at –12ft/sec – coming in for a sliding landing on one of the helipads is demanding, but very rewarding.

You can land anywhere, but you will only be refuelled, rearmed and repaired on a friendly helipad.

You are equipped with eight hellfire missiles, 38 2.75in missiles and a 30mm chain gun with 1,200 rounds.

Weapons are aimed and controlled via TADS, the Target-Acquisition and Designation System. The chain gun can knock out an enemy helicopter, but won't even dent a tank.

There are three combat missions, one for training, in which the enemy forces don't return fire.

Mission two involves clearing just four sectors of allied territory of hostile forces. While in mission three you must clear the entire map of enemy forces, and in the fourth you help allied troops push back the enemy front line.

You are also provided with a map, similar to the one used in Fighter Pilot but used to a much better advantage. It is divided into squares which change colour according to their allegiance.

Beacons and helipads are also shown, and facilities exist to help you find these without the map if necessary.

The cockpit display is fairly comprehensive, with a monitor to display targets identified by the TADS computer, which are also colour coded to help you distinguish between allied and enemy forces.

The normal digital instruments are all there, including attitude, altitude, and rate of climb indicators. There are also meters for power consumption, rotor angle and remaining fuel.

These all take up the lower part of the screen; the map and cockpit window use the top portion.

Colour is generally used to fairly good advantage, although rather lacking in some departments. All the ground is green for instance, and I think a little shading would not have gone amiss.

However, Digital has crammed a lot of features into the simulation. Having flown the RAF's Jaguar simulator which uses three hangars full of relief map and a very expensive hanging camera technique to achieve exceptionally realistic visuals, I can understand the limitations imposed by a 64k home micro.

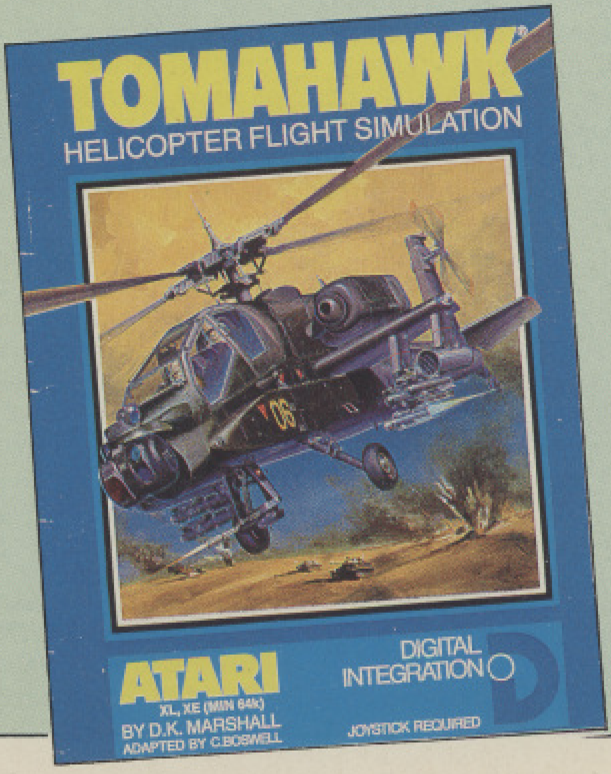
My only negative comment is that ground features – mountains, buildings and targets – are all line drawings. These are fast to replot, but don't give a very good illusion of height – keep one eye on the altimeter at all times.

Overall, this is one of the best programs I've seen in a long time – it's well worth checking out.

Enough basic flying instructions are included to get you off the ground, and particular attention is paid to the use of the collective lever.

Tomahawk is thoroughly recommended for would-be helicopter pilots.

Rob Anthony



Sound	*6*
Graphics	*8*
Playability	*9*
Value for money	*9*
Overall	*9*

Thoughtful warfare



Program: Vietnam
Price: £14.99 (disc)
Supplier: US Gold, Units 2/3 Holford Way, Birmingham B6 7AX.
Tel: 021-356 3388

WAR gamers will welcome this latest simulation from those acknowledged experts in the genre, Strategic Simulations. Although it has been available in the USA for about two years, it has only just reached these shores courtesy of US Gold.

The program allows you to re-enact some of the most bitter warfare of modern times. You control the combined US and South Korean forces against the Viet Cong and the North Vietnamese army.

The single display is a message area below a detailed map of the particular terrain where the action takes place. The map can be scrolled in any of the four cardinal directions and is used to move your forces and direct operations.

The documentation refers to the game as Nam (the original US title) and clearly describes the rules for playing. There are six historical scenarios to choose from, each of which can also be played as a non-historical (randomised troop deployment) episode.

Each scenario can take from 15 to 30 turns to play and each turn is divided into 10 consecutive phases. Most of the play involves moving a large square cursor around the map.

In the observation phase, the cursor can be moved on to friendly units to reveal their characteristics (firepower, range, assault factor, movement potential, armoury and strength). You can also dig in units in this phase.

Next, artillery and airstrike impact areas are targeted, following which the enemy fires at all your units that are in range and then moves its forces.

After this, your troops can move and fire at the enemy. A second exchange of fire then takes place, followed by the artillery fall phase in which the earlier plotted targets are struck.

The final phase shows the comparative state of both sides, with points being gained for the number of units eliminated. A victory indication is also given – questionable, minor, major or decisive. At the end of each complete turn, an opportunity is given to save the game.

The graphics are clear and adequate and sound effects are used to good effect. The simulation is easy to get into and the documentation is both lucid and detailed.

Vietnam is a program that should appeal to the dedicated wargamer and any one who like games that require a liberal dose of strategic planning and thinking.

Bob Chappell

Sound	*7*
Graphics	*7*
Playability	*8*
Value for money	*8*
Overall	*8*

Ze fly be on ye turnip

Program: The Archers
Price: £9.99
Supplier: Mosiac, 187 Upper Street, London N1 1RQ
Tel: 01-226 0828

Rumpty-tumpty-tumpty-tum,
Rumpty-tumpty-tum-tee,
Rumpty-tumpty-tumpty,tum,
Rumpty-tiddly-tum.

Oo, arr, me old pals, me old beauties. Now just you put down them there mangelworzels and harken to old Walter Gabriel 'ere. Mine's a pint of Shires while you're up.

Our scriptwriters and them there clever-sticks down at Level 9 have gone and taken the story of us everyday country folk, the Archers, and stuck it on one of them new-fangled computery machines.

Seems the idea is that you be a trainee scriptwriter and have to plot decisions about four of us loveable folk here at Ambridge: Jack Wooley, Elizabeth Archer, Eddie Grundy and Nelson Gabriel.

Course, if you be going and making decisions that make us folk look as boring as a wet weekend, then them ratings are going to fall.

Spice it up a bit though (watch out, Mrs Perkins!) and them Controller fellas up at the BBC might have something to say, I shouldn't wonder.

What you get on your TV is a picture and a load of writing, telling you what be going on. Every so often, you must choose from a list of three options as to what to do next.

You don't have to do any writing yourself – just keep pressing any of those three numbers whenever you be told. Now even old Walter could do that.

Unless it's the Shires playing tricks (and I'll have another while you're about it Jack), seems like I remember this sorta thing from way back in another Mosaic game about a dairy and a mole called Adrian.

Now, me old turntops, don't go thinking that the game is the same every time you play it 'cos it b'aint be so. Like Sid Perks' Shires (don't mind if I do, Jack), it's a little different every time you try it.

The game is as nigh on as big as a haystack and so has to be forked in in several parts. The pictures are pretty but don't knows as how I go much on 'em. Still, you can always turn 'em off.

Well, me old cabbages, if you be a fan of us old codgers down here in Ambridge, then sure as compost is compost, you going to love this here game.

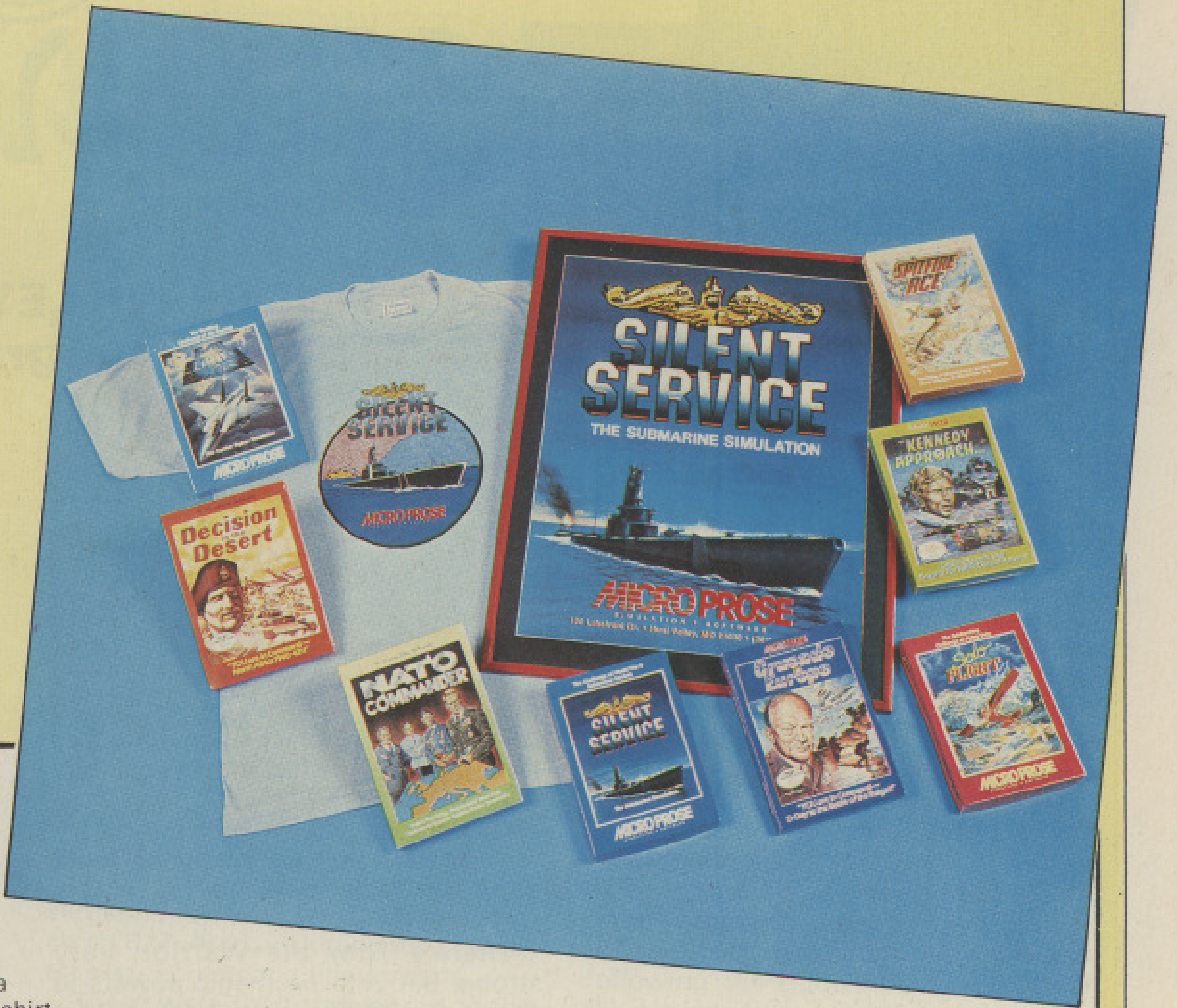
As for me, I be the only one of the Ambridge clan I can stand for more than 10 minutes at a time and so would as soon jump in a threshing machine as listen to their doings, whether it be on the crystal set or on a computer machine.

Each to his own tastes, is what I say – and speaking of tastes, my glass is empty, Jack, me old beauty.

Brillig

Sound	*n/a*
Graphics	*6*
Playability	*9*
Value for money	*7*
Overall	*7*

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3rd prize: A copy of Silent Service, a framed Silent Service poster, plus a T shirt.

20 runner up prizes: A copy of Silent Service, plus a T shirt.

50 further prizes: A Silent Service T shirt.

The world's leading simulation software company, MicroProse, is offering readers of *Atari User* more than £500 worth of prizes in this easy-to-enter competition.

On offer are all of their top-selling titles for the 8 bit, and prizes centred around the smash hit submarine simulation Silent Service including T shirts and framed posters which have been specially flown in from the US for the competition.

Other software prizes include F-15 Strike Eagle, a jet fighter simulation and Decision in the Desert, a strategic game which allows you to recreate the battle between Rommel and Montgomery.

How to enter

All you have to do is make as many words as you can of four letters or more out of MICROPROSE. No plurals, no foreign words and no pronouns please – all words must be in the Oxford English Dictionary.

Then make up a slogan explaining why you enjoy MicroProse simulations, in no more than 25 words.

Send to: ***MicroProse Competition, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

All entries must be in by April 30.

Entry Form

Name____________________

Address____________________

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Age__________

Number of words found: ☐

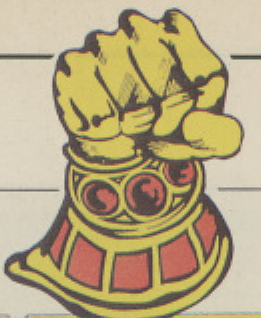
(Please list on separate sheet)

"I enjoy MicroProse simulations because . . ."

(Please use a separate sheet – no more than 25 words)

State T shirt size: ☐ small ☐ medium ☐ large

Preferred format for prize: ☐ cassette ☐ disc





GAUNTLET™

ANDRÉ WILLEY meets the US Gold programming team

IF you had asked any dedicated game-a-holic last year what the arcade smash hit of 1986 was, you would more than likely have been given the answer: Gauntlet.

As far removed as imaginable from the straightforward zap-attack space games which seem to dominate the arcades, this unlikely success was a multi-player graphic strategy affair based on the dungeons and dragons theme.

At long last, this amazing game has been converted for home computers, and the Atari 8 bit version was in the final stages of development when I went along to U.S. Gold's Birmingham headquarters to meet the programming team who have had number one chart hits with every new version they've completed.

First of all I wanted to see what all the fuss had been about, so Kevin Bulmer, graphic designer of the team, took me down to the warehouse to see the original Atari arcade machine in action.

I'd often seen crowds of people huddled over these strangely designed machines, but I'd never quite had the nerve to try and play one on my own – it all looked so complex.

However, I quickly found myself getting the hang of it and an hour later I was blessing the fact that the coinbox was deactivated.

Gauntlet has four main characters – the heroes – for you to choose from, each with their own special powers and abilities.

There's Thor the Warrior, very strong, but with no magic powers to speak of, and Thyra the Valkyrie, not so good in combat but with some ability in magic.

If you want real spell-casting power you should select Merlin the Wizard, but don't get him into hand-to-hand combat with one of the nasties. The same applies to Questor the Elf, but what he loses in magic he gains in weaponry.

The characters must find their way around a series of complex dungeons, in which live hoards of deadly ghosts, demons, grunts and other adversaries. They may be shot at, fought hand-to-hand or killed with magic spells which you collect as you travel.

Also in the dungeons are keys to get through locked doors, food and drink to increase your health rating, treasure to boost your score and ghost generators which regularly create more nasties if you don't blow them up in time.

There many other things to collect or destroy, but I'll leave you to find out about them for yourselves . . .

Often you will need more than one player to complete a level successfully, with perhaps Merlin casting a spell to clear the way for the others to get through a door. He is the only one who can make full use of the magic potions you see, but he is very vulnerable to attack.

Any player may start at any time by dropping a few coins into the slot – there isn't any obvious start and finish to the game. The early stages are certainly easier, but as your skill develops you will find yourself moving into higher and higher levels.

Technically the game is fantastic, with stereo sound and speech and some amazing graphic action controlled by a 68000 processor with 4Mb of ram.

It has two main graphics chips at its disposal – with one, known by the unlikely name of Slapstick, responsible for generating the 24 by 24 pixel sprites in up to 16 colours from a palette of 4096.

The sound effects are generated by a chip with which most of you will be familiar since it is sitting inside your faithful 8 bit Atari.

Gauntlet actually uses a standard Pokey chip to generate its amazing sound, with a separate 6502 keeping track of what it and the dedicated speech chip are up to. The whole thing is then separated out into stereo – but don't ask me how they manage it.

The Atari connection goes still further, because the whole Gauntlet concept was based on an old 8 bit



The main title screen as seen on an 130XE

Atari APX title called Dandy Dungeons, written by John Palevitch, the man responsible for Deep Blue C, among other things.

Having seen the arcade machine in all its glory we went back to meet the rest of the team. I've already mentioned Kevin Bulmer, the artist of the group, who designed the title graphics, characters, monsters and so on.

Tony Porter developed many of the utility programs used for all versions of the game, and also wrote the Spectrum, Amstrad and MSX versions.

Bill Allen was responsible for the sound and music on all the conversions, and he developed special routines to allow programming to be carried out on a central TDI Pinacle multi-user system and then downloaded to each machine in turn.

The final member of the team is Bob Armour, who was in charge of the Commodore and Atari 8 bit versions.

Bob was also responsible for developing a special machine code monitor program for the Atari to allow the Pinacle to transfer its data via the second joystick port – considerably faster than a disc drive could. An entire 22k block of program data could be transferred in about 10 seconds.

Logically enough then, it was Bob who took me through some of the differences between the arcade and home versions of Gauntlet.

The first obvious and necessary alteration is the fact that only two characters can function at a time, as opposed to the original arcade machine's four controller system.

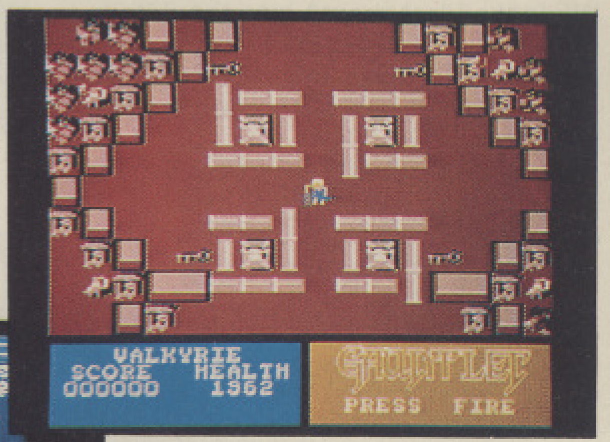
The only home computer capable of working with four joysticks is the Atari 400/800, but it wasn't considered viable to make a special four player version considering the limited number of these still in circulation – not to mention the lack of any more processor time and memory – Gauntlet needs a minimum of 64k to run.

You can, in fact, play a completely solo game, but there's almost no way to get through some of the higher levels without a friend's help.

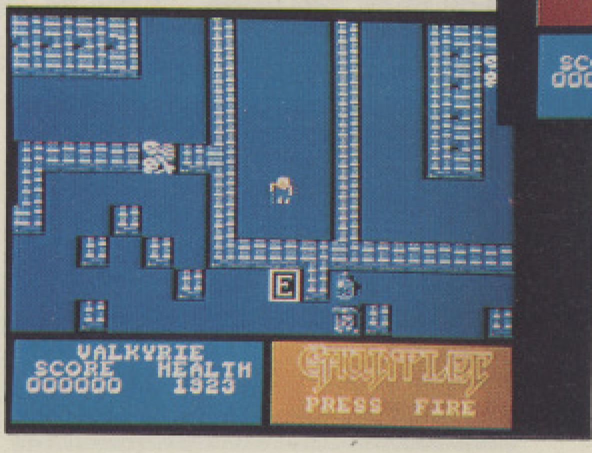
You can choose your characters at the start of the game, or the second player can start at any other time and the computer will randomly select a persona.

The Atari version loses out somewhat in terms of colour range, and it really shows the lack of a 16 colour high resolution screen on the 8 bit machine.

The team opted for maximum detail rather than colour – the result is a four colour playfield. That said, there is so much going on that you don't really have time to think about graphics or colour – you can be attacked by up to 192 ghosts at once.



Thyra the Valkyrie searches the vast dungeons for treasure, using keys to open up new sections



'E' marks the exit to the deeper dungeons. Notice, too, the cider bottle which adds 100 points to your health rating.

Much of the development work for all the home versions was completed on an 8 bit Atari, including the character sets, sprites and title screens.

These were then transferred to the Pinacle development system for later downloading into the other machines. On the other hand, the game graphics, maps and sound effects were developed on an Amstrad and transferred in the opposite direction.

The arcade game had some 128 dungeons to explore, but you have 512 to work your way through, loaded at random after the first seven standard screens.

This means that no two games are ever likely to be the same, and even if you do somehow manage to get through them all, U.S. Gold will soon be releasing a disc and tape containing another 512 rooms . . .

Some of these convoluted challenges have been designed by the main programming team, but others have been sent in by players of some of the other home computer versions following the guidelines given with the package.

This kind of interaction with the players is typical of the game, and something which the programmers have encouraged whenever possible.

Gauntlet is almost certainly set to be the best selling 8-bit game of the year, and from what I've seen no gamer's collection will be complete without it.

It combines a frantic arcade shoot-em-up with the strategic importance of obtaining and using the various keys, potions and spells you'll find as you explore. Once you start playing, you won't be able to put it down.

Right then Merlin, where's that amulet got to . . .



The Atari programming team. Kev Bulmer and Bill Allen at the back, and Bob Armour in front

Delving into data transfer

Part 4 of André Willey's series on the Atari's input/output facilities

WE looked last month into the details of the CIO command system, and armed with that information the question I left you with should have been a doddle.

If you remember, I asked you why it wasn't feasible to use the XIO command to perform the Binary Put and Binary Get operations from Basic.

There are actually two reasons, both related to the parameters which XIO passes to the operating system. The command number is obviously no problem, but in addition XIO passes three other pieces of information to CIO – the values of ICAX1 and ICAX2 (the first two auxiliary bytes) and the address of a string containing the filespec information.

Unfortunately the Binary Put and Get commands need to be supplied with a buffer address, not a filespec address – though at a push that could be overcome by using a long string.

However, XIO has no facility at all to send the length bytes ICBLL/H, without which the binary transfer operations can't function. In fact, XIO actually corrupts any existing values, which means you can't POKE them in beforehand.

Now that we've covered the operation of CIO from the end-user's point of view let's take a look at how the operating system handles the command block we've provided. Perhaps the easiest way to do this would be to follow the OS through the CIOV vector at $E456 and see what happens next.

Firstly, all the operating system has to work with is the value in the X register, which tells it which ICOB to use. We've re-printed the table of IOCB addresses as Figure I, and let's assume in the example that we are using IOCB one, at address $350.

The X register will therefore contain the value $10 (16 in decimal), which is the offset from the start of the IOCB tables – 16 on from $340 being $350.

Using the X register as an offset, the OS now copies all of the relevant information into a special work area in page zero. Known as the Zero page Input/Output Control Block, or ZIOCB, it sits at $20 (32 decimal), and needs to contain the same information as IOCB one did. ICCOM becomes ICCOMZ, ICAX1 becomes ICAX1Z, and so on.

The next thing the OS must decide is just what type of device you want to access – cassette, disc, printer, screen or whatever. It finds this information by checking the buffer address, which in turn points to your filespec string containing the device identifier (C:, D:, P:, S: and so forth).

Once it has this device specifier (for argument's sake, let's say it was P:) it must decide which piece of code is appropriate to handle the data, and where in memory it may be found.

You may remember Figure II from the first part of this series, in which we described the various types of device that the OS could access, and it is to this Handler Address Table that the OS goes next.

In fact, it starts looking for the name P: at the end of HATABS rather than the beginning. This rather useful fact means that adding a new handler to take over from an existing one is very easy – you simply tack it on to the end of the list and the OS search will find and use your new entry before it reaches its own original version.

Once the device name has been found the OS knows that the next two bytes will contain an address for the

IOCB Zero	$340	(832)
IOCB One	$350	(848)
IOCB Two	$360	(864)
IOCB Three	$370	(880)
IOCB Four	$380	(896)
IOCB Five	$390	(912)
IOCB Six	$3A0	(928)
IOCB Seven	$3B0	(944)

Figure I: IOCB Start Addresses

HATABS + 0	P	$E430	(58416)
HATABS + 3	C	$E440	(58432)
HATABS + 6	E	$E400	(58368)
HATABS + 9	S	$E410	(58384)
HATABS + 12	K	$E420	(58400)
HATABS + 15	D	$07CB	(1995)
HATABS + 18	R	$226D	(8813)
HATABS + 21	–	$0000	
HATABS + 24	–	$0000	
HATABS + 27	–	$0000	
HATABS + 30	–	$0000	
HATABS + 33	–	$0000	

NB: Assumes Dos 2.5 and 850 RS-232 handler present. Unused entries are filled with zeros.

Figure II: The Handler Address Table at $31A (794)

handlers associated with it, as shown in Figure II. In the case of our P: example this would be $E430 (58416) – high inside the machine's rom.

So have we at last found the address of the machine code which will transfer our data to the printer? Well, not quite. What we actually find when we look at $E430 is yet another table.

This one, the Handler Vector Table, contains six two-byte addresses of the machine code routines to be used for each possible command we might have required. These are similar to the commands we talked about last time, and consist of Open, Close, Get Byte(s) Put Byte(s), Get Status and Special.

The addresses given in the table are in fact one byte lower than the actual beginning of the machine code routines, so if you want to call any of them for yourself don't forget to add one to the location given.

The reason for this is rather complex and involves the 6502 JSR and RTS operations, so unless you want to delve further, it's probably best to take it at face value.

There are five of these vector tables in all – one each for the editor, screen, keyboard, printer and cassette – and each is 16 bytes long. The first is located at $E400 (58368), and then every sixteen bytes thereafter. The first 12 bytes in each table contain the six vectors mentioned, leaving us with four bytes per table so far unused.

The first three of these contain a machine code jump instruction to the initialisation code for the device, and the last byte is unused.

The first five commands (Open, Close, Get, Put and Status) are obvious, but the Special vector needs some clarification. This points to the machine code which handles all of the hardware-specific functions of a given device not covered by the normal I/O commands – basically all those operations with an ICCOM number greater than 13.

These include the disc commands (such as Rename, Erase, Protect, Unprotect and so on), the RS232 commands, the screen drawing commands and any others which apply to a specific device only.

In some cases – such as our printer example – no extra functions are available, so this command will do nothing but return an error 146 via the Y register – Function not Implemented.

Don't forget that when Atari modified the operating system for the XL/XE range it moved a lot of the machine code around in memory.

	Device	Open	Close	Get	Put	Status	Special	JMP to
$E400	E:	F3FB	F633	F63D	F6A3	F633	F63C	F3E4
$E410	S:	F3F5	F633	F592	F5B6	F633	FCFB	F3E4
$E420	K:	F633	F633	F6E1	F63C	F633	F63C	F3E4
$E430	P:	EE9E	EEDB	EE9D	EEA6	EE80	EE9D	EE78
$E440	C:	EF4B	F02A	EFD5	F00F	F027	EF4A	EF41

Figure III: The rom based Handler Vector Tables (old 400/800 OS)

Thus, while the rom-based Handler Tables will always be found at the same locations in any Atari, the contents of those tables will be completely different for an XL or XE when compared to those of a 400 or 800.

Figures III and IV show the values in both cases, but should Atari do another major re-write of the OS for a future machine, they could all change again.

You will notice that neither Figure III nor IV contain any vectors for the disc or RS232 handlers. These are both special cases which load themselves into memory from the unit in question.

On disc this handler is the Dos system which you place on your boot disc. It obviously has no rom based vector table, and so must contain its own.

When Dos loads it places an entry in the Handler Address Table (HATABS) which points to a similar block of vectors within its own code in ram. Since there is no rule that a vector table must be in rom, we'll be using this same technique next time to add our own device driver.

Now the OS has at last found the actual address of the routine it requires. It does a JSR to the relevant piece of code and the handler itself takes over, looking up the information it needs from the zero-page IOCB.

We won't be going any deeper into the I/O system at this point because here the Serial Input Output system (SIO) takes over in order to pass our data to the peripheral in question.

Once the data transfer is complete the handler updates the information in the ZIOCB, such as modifying the length count to the actual number of bytes transferred and updating the status variable.

All it then needs to do is place the error code back in the Y register and return control to CIO.

CIO now does a little housekeeping of its own. It places the original value back in the X register and moves the modified contents of the ZIOCB back into the calling IOCB – in our example that would be IOCB one.

Finally, before returning to the calling program, it checks the Y register, and if its value is anything other than 1 (1 being the code for no error) it sets the minus flag in the 6502 to indicate that the user should look into the error condition.

So now you know what the operating system gets up to when you do a simple JSR CIOV. The whole operation takes time, of course, but is very flexible indeed.

You can see this time delay for yourself by sending 1000 bytes of data to a disc or tape using multiple PUT commands, and then by using the Binary Put program from last month.

● *Have a think about the difference in execution times and see if you can explain it – I'll let you know the answer next month, when we'll begin to put together our own device driver program.*

	Device	Open	Close	Get	Put	Status	Special	JMP to
$E400	E:	EF93	F22D	F249	F2AF	F21D	F22C	EF6E
$E410	S:	EF8D	F22D	F17F	F1A3	F21D	F9AE	EF6E
$E420	K:	F21D	F21D	F2FC	F22C	F21D	F22C	EF6E
$E430	P:	FEC1	FF06	FEC0	FECA	FEA2	FECO	FE99
$E440	C:	FCE5	FDCE	FD79	FDB3	FDCB	FCE4	FCDB

Figure IV: The rom based Handler Vector Tables (Current XL/XE OS)

MEGAPAC

520 STFM SYSTEM BY A.S.&T.

The new 520 STFM from ATARI has been an instant hit since its announcement. The design has gained from experience with earlier ST and STM machines and the result is a practical and superbly engineered computer that will easily find its place in your home as well as in your business.

MEMORY:

The basic 520 STFM has 192K bytes of ROM, an optional 128K bytes of plug-in ROM cartridges and 512K of RAM. The MEGAPAC 520 STFM has bigger memory — a full ONE MEGABYTE of RAM, like the 1040 STF.

DISC DRIVES:

The basic 520 STFM has a built-in single-sided disc drive. The MEGAPAC 520-STFM comes with two drives, one internal and one external. The latter is double-sided, offering twice the capacity (720K) of the built-in drive (360K). Your disc bill can be cut by almost half when compared with that of basic 520 STFM users.

PROCESSOR:

The Central Processor unit (CPU) is a Motorola 16/32 bit 68000 chip, running at a clock speed of 8 MHz. It is further enhanced by Atari's own custom ICs providing a Direct Memory Access (DMA) channel for fast data transfer with other peripherals such as the ATARI SH204 Winchester drive or the Atari Laser printer (available soon) and a real time clock.

DISPLAY:

The 520 STFM can display 40 or 80 column text on any domestic TV or colour monitor such as the Philips CM8533 or the dedicated ATARI SM125 high resolution monochrome monitor. Graphic is 600 × 400 pixels on the SM125, 600 × 200 pixels in 4 colours or 320 × 200 pixels in 16 colours on a colour monitor or TV. The colour palette contains 512 possible colours. Some ATARI software indeed uses the exceptional display hardware to produce stunning graphics with up to 256 colours at once.

MIDI INTERFACE:

The 520 STFM has 3 programmable sound voices and a Musical Instrument Digital Interface (MIDI) to allow direct connection to a wide range of musical organs and synthesizers such as the Casio CZ230S.

MOUSE:

The 520 STFM has its own dedicated mouse as part of its standard hardware.

PERIPHERAL CONNECTORS:

The 520 STFM can be easily expanded by plugging in 'add-ons' through its ports. They will accept printer (Centronics port), Modem (RS232 port), musical instruments (Midi port), sensors (joystick port) and fast intelligent devices such as network, Winchesters, laser printer etc (SCSI port).

BUILT-IN SOFTWARE IN ROM:

The 520 STFM has 192K bytes of permanent software in ROM. This comprises GEMDOS, the disc operating software which is now becoming the dominating standard for 16 bit computers, and GEM, the Graphic Environment which uses pictures and drawing instead of cryptic messages to communicate with the user and the electronic Mouse in place of the keyboard to enter the user's commands.

SOFTWARE ON 5 DISCS:

The MEGAPAC 520 STFM comes with 5 discs, containing an impressive collection of software by any standard:
Disc number 1: contains the BASIC language.
Disc number 2: contains LOGO, + DOODLE + MEGAROIDS, and STWRITER a WORDPROCESSOR program.
Disc number 3: contains Neochrome, a painting program and demo pictures.
Disc number 4: contains CPM utilities.
Disc number 5: contains the CP/M emulator.



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SYSTEM BUILDERS . . .

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2 520 STFM computer keyboard, internal PSU, internal single sided (360K) disc drive, 512K RAM, 5 s/w discs £371.00
3 520 STFM with monochrome (SM125) monitor £464.00
4 520 STFM+ computer keyboard as above but with 1 MB RAM £439.00
5 520 STFM+ with monochrome (SM125) monitor £533.00
6 MEGAPAC 520 STFM £539.00
7 MEGAPAC 520 STFM with monochrome monitor £633.00
8 1040 STF computer keyboard, internal PSU, internal double-sided (720K) disc drive, 1 MB RAM, 5 s/w discs .. £556.00
9 1040 STF with monochrome monitor £649.00
10 MEGAPAC 1040STF (twin double sided drives) £655.00
11 MEGAPAC 1040 STF with monochrome monitor £749.00

MONITORS:

1 SM125-12" high resolution (600 × 400) B/W monochrome £135.00
2 SC 1224-12" medium resolution (600 × 200) colour monitor £372.00
3 Philips CM8533-14" medium resolution colour monitor £299.00
4 NEC Multisync-14" colour monitor, can replace SM125 and SC1224 to display hi-res monochrome and colour £699.00

DISC DRIVES:

1 SF354 single sided disc drive with PSU, 360K £139.50
2 SF314 double-sided disc drive with PSU, 720K £185.50
3 A.S.&T. 1000C double sided disc drive for STF or STFM, uses ST's PSU £99.00
4 Stand-alone PSU for the above if required (eg 520 ST) £25.00
5 Twin 1000C with PSU for 520 ST £199.00
6 A.S.&T. 1000F – 5¼", double-sided disc drive, 720K, alternative choice to SF314 or A.S.&T. 1000C but with 40/80 track switch for IBM PC and compatible discs £124.00
7 Stand-alone PSU for the above if required £25.00
8 SH 204 – 20 Megabyte hard disc (Winchester) £640.00
9 SH 204 – 40 Megabyte hard disc (Winchester) £1,149.00

PRINTERS:

ATARI SMM 804 printer, 80 cps £199.00
2 STAR NL-10 compatible printer. 120 cps in draft mode and 30 cps in near letter quality (NLQ). All control codes are EPSON FX compatible £269.00
3 STAR NX-15 compatible printer. 120 cps wide carriage £385.00
4 STAR NB-15 compatible printer. 300 cps draft. Near Letter Quality and Letter quality printer. Top of the range. Special offer for limited period (you save £243.00) £699.00
5 JUKI 5510 printer. 180 cps in draft, 40? cps in near letter quality £329.00
6 MP165 compatible printer. 165 cps in draft mode. 40 cps in letter quality. Exceptional value £219.00
7 JUKI 6100 daisy wheel printer. 20 cps £285.00
8 Black ribbon for all dot matrix printers from £5.00
9 Different faces Daisy Wheels from £15.00
10 Fanfold paper 11" × 9.5", 60 gsm, 2000 .... £14.00
11 Fanfold paper 11" × 9.5", 100 gsm, 2000 .... £30.00

BOX OF 10 DISCS:

1 Sony 3.5" single sided, double density £22.00
2 Sony 3.5" double sided, double density £29.00

CABLES:

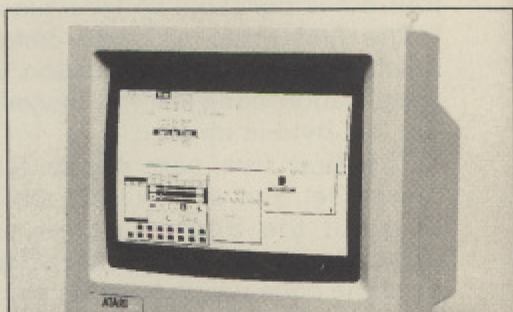
RGB video leads for Sony or Grundig TV with Euro connector, Philips CM8533 .... £15.00
Atari drive leads £15.00
Printer leads £15.00
Modem leads £15.00

BABT APPROVED MODEMS:

1 WS4000 .... £172.44
2 WS3000 .... £569.25
3 Fastcom terminal software, supports also Prestel £49.95
4 BBS Version 2.0 for Bulletin Boards £49.95

MIDI INSTRUMENTS:

1 Casio CZ230S £295.00
2 Easy Track Midi software £59.95



SM125 12" MONO MONITOR



SC1224 12" MED RES COLOUR



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The Concise Prog. Ref. Guide	£15.95
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Atasri ST Tricks & Tips	£12.95
Gem on the Atari ST	£12.95
Graphics & Sound on The Atari ST	£12.95
Grapic Applications for the Atari ST	£11.95
Machine Language on the Atari ST	£11.95
Atari ST Explored	£8.95
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The C Programming Language	£22.95
Atari ST Companion	£9.95
Working with the Atari ST	£7.95

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NEWSLETTER

MicroLink on the rates

BRITAIN'S 105-year-old Rating and Valuation Association has taken a giant stride into the 20th Century with the help of MicroLink.

Previously, the professional organisation for property experts in local government and private practice depended on phones and letters to communicate. It didn't even have telex.

Now its 5,000 members – town hall finance and housing administrators, and chartered surveyors and valuers – will benefit from not only telex, but also electronic mail and Telemessages.

The Association conducts a four year course leading to professional exams, provides an information service, publishes text books, and holds between 70 and 80 conferences a year.

Assistant secretary Julian Price said:"MicroLink will give us the means to speed up our organisational communications, moving documents to and and fro between our Council members who are located all over the country, contacting our members and exchanging information with our affiliates in the US.

"It will also help us organise our conferences, book hotels and speakers and make travel arrangements for delegates".

Software hotline fills the gap

A REVOLUTIONARY support package for business and communications software users which includes membership of MicroLink has been launched by systems consultancy and software design firm Interlex.

It will provide previously unavailable support for the lower-priced – generally under £150 – software packages.

In addition, MicroLink will provide Interlex users with the bonus of electronic mail, telex and other comunications facilities and databases.

Interlex managing director Mike Lane said:"As the trend toward low cost hardware and software has gathered momentum, the traditional dealer network has moved upmarket.

"Consequently the bulk of new business micro users have been left totally unsupported because the High Street and volume sellers supplying them are not geared up for the task.

"Interlex will fill the vacuum by supplying support at a price the new generation of users can afford.

"Initially this will be provided through a telephone hotline, but we are pushing ahead with plans for an Interlex bulletin board on MicroLink to extend the service to comms users".

Japan comes to Salop

MICROLINK was the catalyst for language school proprietor Duncan Baker's latest venture – teaching Japanese to British business people.

The new addition to the curriculum at Lydbury English Centre in Shropshire developed from a sociable electronic mail exchange on MicroLink with antiquarian bookseller Tony Swann.

Swann revealed a long cherished ambition to study Japanese and suggested that Baker organise a course.

This has now been done, and after being advertised on MicroLink half the places were filled within a week.

High peak, low tech in Tibet

ACCORDING to crack mountaineer Chris Bonington, "it's only a small trip compared to climbing Everest and I'm looking forward to coming home and getting to grips with MicroLink".

He was speaking a few days before leaving for Tibet, hoping to add the unconquered peak of Menlungste to his own collection of Himalayan "scalps".

When he's not climbing mountains Bonnington can often be found at a computer keyboard writing one of his numerous books and articles or simply mastering the latest micro technology.

A self-confessed computer buff, he has joined MicroLink because it will help him organise his expeditions.

"The telex facility will be absolutely invaluable in this respect", he said. "At present I have to rely on the generosity of my accountant and use his office telex machine if I want to send and receive messages, but obviously this isn't always convenient for either of us.

"Transmitting text to my publishers is a definite possibility. They are a rather old-fashioned firm, but who knows, I may be able to convert them to Email. As a newcomer to MicroLink I'm also looking forward to exploring its many sections just for the fun of it.

"Unfortunately I won't be able to use MicroLink to keep in touch with home while I'm in Tibet. Where I'm going is so remote that my messages will have to be carried by runner for three days before they reach the nearest road".

YOUR chance to join MicroLink – turn to Page 4

By Brillig

One way to make The Payoff

The postbag continues to bulge, and still the greatest number of cries for help are regarding The Payoff. In many shops The Payoff was thrown in as an extra goody with each new Atari micro bought, so this probably accounts for its apparent popularity.

Since I can't hope to answer every query that comes in about it, and also because The Payoff has been around quite a long time I've decided this month to give you a simplified and condensed solution to the whole adventure.

There are many different ways of solving The Payoff, so this solution is just one. But be warned – it does not aim to encompass all the nuances.

It doesn't always tell you what items to drop and when, so you might sometimes find you're carrying too much. However it shouldn't be too hard to work out which items can be disposed of once they've served their purpose.

Also this solution doesn't give all the required directions to get to a given location – you should be able to fill in the gaps here by exploring and referring to your own map as it is built up.

Well, you can't have it all on a plate, you know!

Before I leave The Payoff, you might be amused to hear that Marc Jones of the Wirral, Merseyside shortened the command "Break Window" to "Break Wind" and received the cheeky response, "That's better!".

Now to some more of your worries. Among others, Jason Kirwan of Hackney and Richard Coughlin of Luton are having trouble with the decoder listing in Basic that comes with Level 9's solution sheet to Worm In Paradise.

I have checked the listing and it definitely works, so perhaps you have mistyped part of the listing? Make sure that you haven't mistaken the number 1 for the letter l or zero for the letter O and vice-versa.

Perhaps someone can help Darren Amis of Leicester, who is experiencing a little difficulty with the pygmy in Mordon's Quest and the maze in Adventureland.

Playing the Golden Baton, Mr A S Smith from Havant can't see in the dark hole and is unable to light the oil rag.

K. Rennison wonders how to sur-

→



THE PAYOFF

Read note : Go counter : Place bet : Drop all : Climb pipe : Go up : Get hoist : Go down : Go ledge : Open window : Go window : Go South until you reach the street then Go East : Go tent : Get sledgehammer : Go North, West, North, North : Smash door : Go office : Get ashtray : Rub ashtray : Feel painting : Open safe : Look safe : Get control : Drop sledgehammer : Go to bathroom : Get can, razor, pills : Go to kitchen : Drop hoist : Get gloves and wear them : Go back to tent : Go down : Cut yellow wire : Drop gloves and razor : Go up : Go to newstand : Get newspaper : Go to garage : Go pit : Get bits : Go to costumiers : Hit costumier : Go East : Climb fence : Drop all : Climb fence and return to office then kitchen : Look fridge : Get meat : Look cupboard : Get treacle : Get hoist : Return to courtyard and climb fence again.

Get pills : Drug meat : Give meat : Get can, newspaper and control : Up to the fire escape : Go ledge : Spread treacle and stick newspaper on the window : Jump : Drop all : Down : Go shed : Look toolbox : Get stool, hammer, screwdriver and drill : Go East : Get bits : Up to fire escape : Drop stool : Get can : Stand stool : Open and then spray alarm : Go ledge : Smash window : Go window : Move cabinet : Unbolt, open and go firedoor : Get pills and control : Go to security desk and drug coffee : Go to secretary's office and get umbrella : Go North and drop umbrella : Phone guard (he will wake and drink the drugged drink) : Get guard : Go lift : Press button : Press control : Go chamber : Press palm (of guard) : Get list from desk: Return to secretary's office: Look typewriter : Look plug : Get fuse : Fit fuse into drill : Go to storeroom : Go firedoor : Down : Get hoist : Return to manager's office.

Drill floor : Get umbrella and put it in hole (put umbrella) : Open umbrella : Drill floor again : Rig hoist : Go hoist : Drill box (number found on list) : Open box : Get gem : Go hoist : Return to storeroom : Go firedoor : Down : Climb fence : Go to carpark : Give gem (and receive key) : Unlock car : Go car : Get briefcase : Go carpark : Go West, West, West, North, North, North and up : Climb gutter : Go down and West : Give briefcase.

Voila! The game is finished!

vive underwater in Red Moon.

The Bugblatter Beast from Traal in Hitch-Hikers Guide to the Galaxy is causing Ken White and many others to come to grief. Some relief is afforded to all these woes in this month's Hints 'n' Tips section.

Laura Haston of Canterbury has got a fair way into The Pawn, but needs to know how to get past the dragon for maximum points. To the rescue comes Barnabas Townshend, of the romantically named Dick Turpin's Cottage in Buckinghamshire, whose solution is given below. (Do any other readers live at addresses that are particularly appropriate for adventurers? If so, let's hear from you).

D. Edwards of Crosby, Liverpool has written in with the method to get past the trapdoor in Waxworks. This problem has been troubling several readers, among them J.D. Astbury and G. Bell of Gorton. What you have to do is go to trapdoor in the roof and simply Fix Beam. You return and just walk over it. Easy when you know how.

The diehard adventurers among you might be interested in a sample magazine I've been sent called Adventure Probe, privately published and aimed solely at adventure players.

This monthly publication features reviews, tips, articles, maps and sundry other adventure-related material. By the looks of the issue sent to me, Adventure Probe is well worth buying. If you're interested in getting a copy, or taking out a subscription, you can contact the editor, Sandra Sharkey, at 78 Merton Road, Highfield, Wigan, WN3 6AT.

Following my Christmas declaration of my favourite top twenty adventures, Allan Palmer of Basingstoke wondered why Infocom's Deadline wasn't included. He says that although it is one of Infocom's earlier games, he still finds it a well-executed implementation which has paved the way for greater interaction with other characters in an adventure.

I'm inclined to agree with him and think that I must have left it out by oversight. Of all the whodunnit adventures, Deadline and Suspect are the best, and the interaction of the player with the characters is superbly done. Trouble is, what adventure can I drop out if I am to substitute Deadline? An embarrassment of riches, that's the problem.

While we're on the subject, why not write in with your own top ten adventure lists? I'd be fascinated to find out what other people enjoy playing and why, and might publish some of the lists in a future issue.

On the subject of your letters, my mailbag grows ever larger each month and although I can't guarantee a personal reply to everyone, your chances of getting one are much improved if you can enclose a stamped self-addressed envelope with your query.

Brillig can turn base metal into gold, but unfortunately my local Post Office steadfastly refuses to take 100 ton gold nuggets!

'Till next time . . . exciting adventuring!

HINTS 'N' TIPS

MORDON'S QUEST

Pygmy proving a pest?

EPIP WOLB HTIW YMGY PLLI KNEH TSEI RREB DNAN ROHT OOBM ABHT IWEP IPWO LBEK AM

ADVENTURELAND

Stuck in the pits?

"YAW A"YA SDNA GURN OTIS

GOLDEN BATON

Have you got a light, mac?

PMAL LIOR EPOR PATE GOTE LTSA CEHT OTTA OMEH TMIW STSU MUOY

RED MOON

Can't breathe underwater?

GNIB UTDN AKSA MSAG KSAL FEHT DEEN UOY

HITCHHIKERS' GUIDE

Beast baffling you?

1. LAIR OMEM ENOT SDNA SEHT TAKO OL

2. ?EMA NRUO YROF UOYK SATS AEBE HTSE ODYH W

3. DAED YDAE RLAE RAUO YTAH TMIH ECNI VNOC

THE PAWN

Dragon blocking your way?

1. SWOD AHST AKOO L

2. SEPA HSTA ETIH WENI HS

3. SEPA HSTA TNIO P

4. HTRO NOG

LIFELINE

THESE readers would like their names to be added to the Lifeline postal contact list:

Allan J. Palmer, 97 Packenham Road, Basingstoke, Hants RG21 1YA: **Adventureland, Pirate Adventure, Mission Impossible, Voodoo Castle, The Count, Strange Odyssey, Mystery Funhouse, Pyramid Of Doom, Ghost Town, Savage Island I, Zork 1, Zork II, Zork III, Deadline.**

Andrew Lewis, 26A Hanover Square, Leeds LS3 1AW: **Jewels Of Darkness trilogy, Silicon Dreams trilogy, Mercenary 1 and 2.**

Mr C. Leighton, 34 Bonnington Crescent, Sherwood, Nottingham NG5 3EY : **The Price Of Magik, Red Moon, Lords Of Time, Dungeon Adventure**

GLITCHES OF THE MONTH

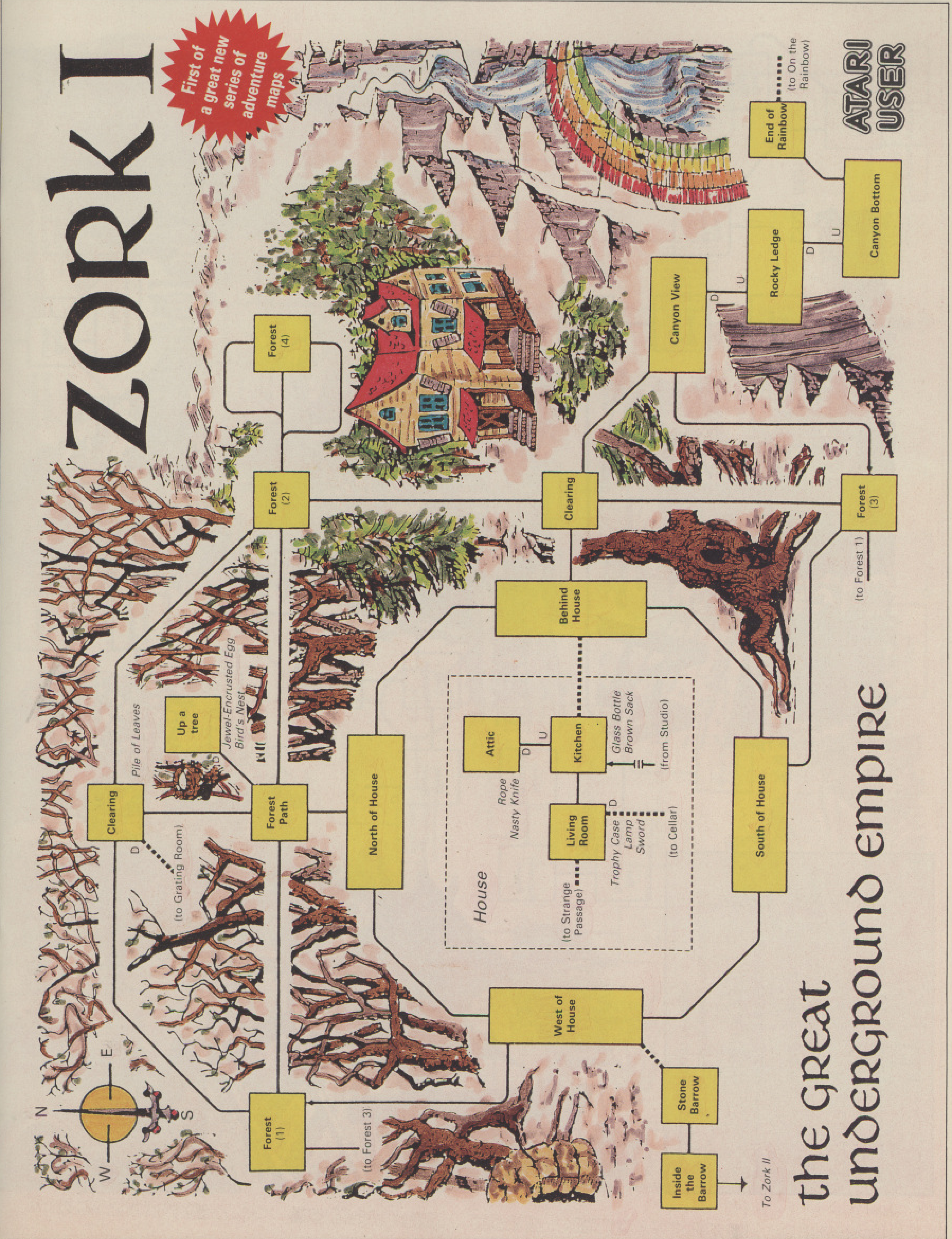
Martin Walsh of Ripon has found two nice glitches in ***The Pawn.*** *He has found that it is possible to tear the paper wall with the immovable hook in the cupboard. He has also discovered that although you can't normally take the pedestal, you can if you put something on it. Good work, Martin!*

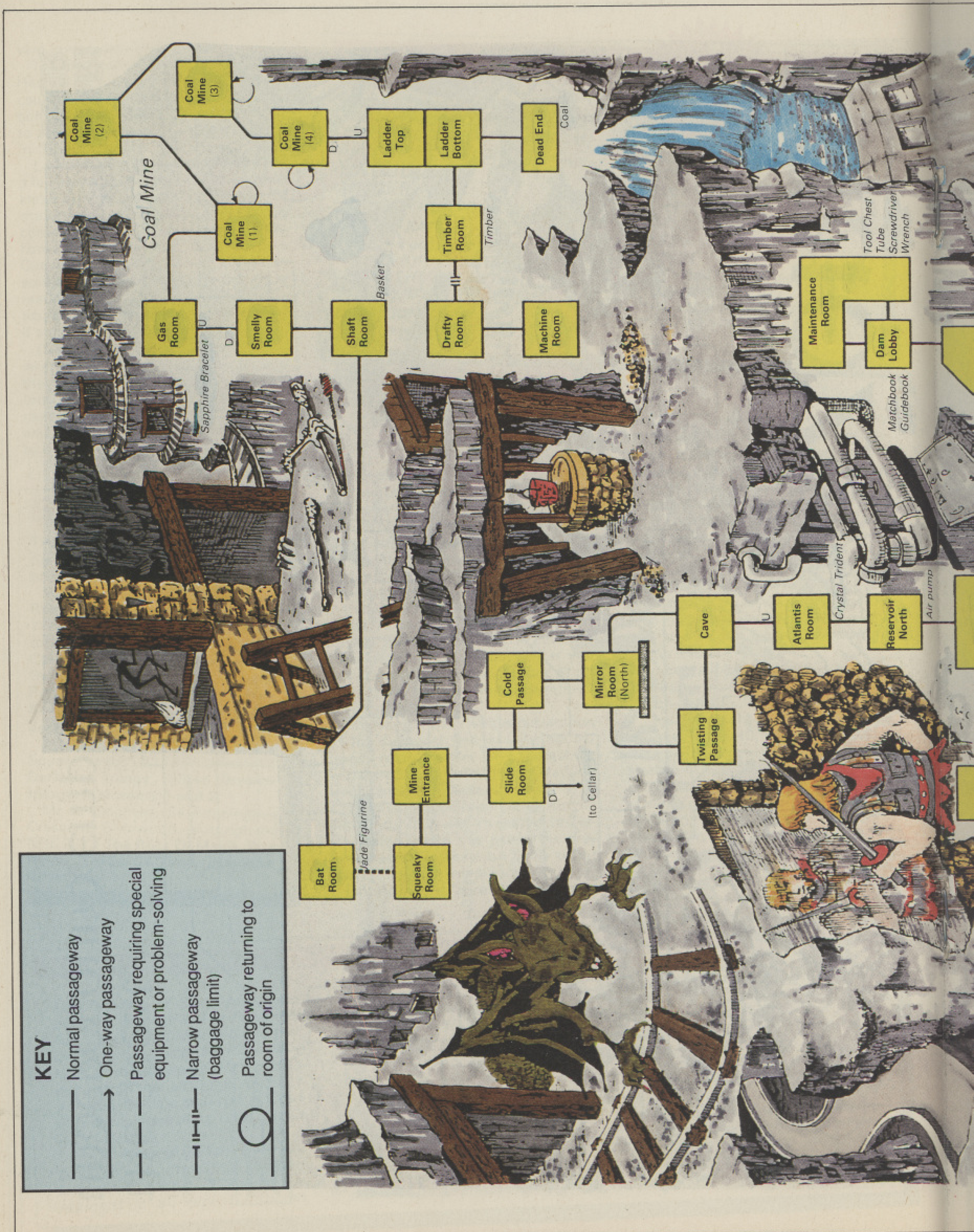
Mr. A. Phule of Berkshire has discovered an amazing hidden backdoor which, it seems, is resident in all recent Infocom adventures. Starting with the ***Enchanter*** *trilogy, if you type in the command SAY LIRPA at the input prompt the entire text will be dumped on to the screen page by page.*

If you have a printer you can direct the output to it instead by using the command SAY LOOF, or SAY LOOF LIRPA to dump to both screen and printer.

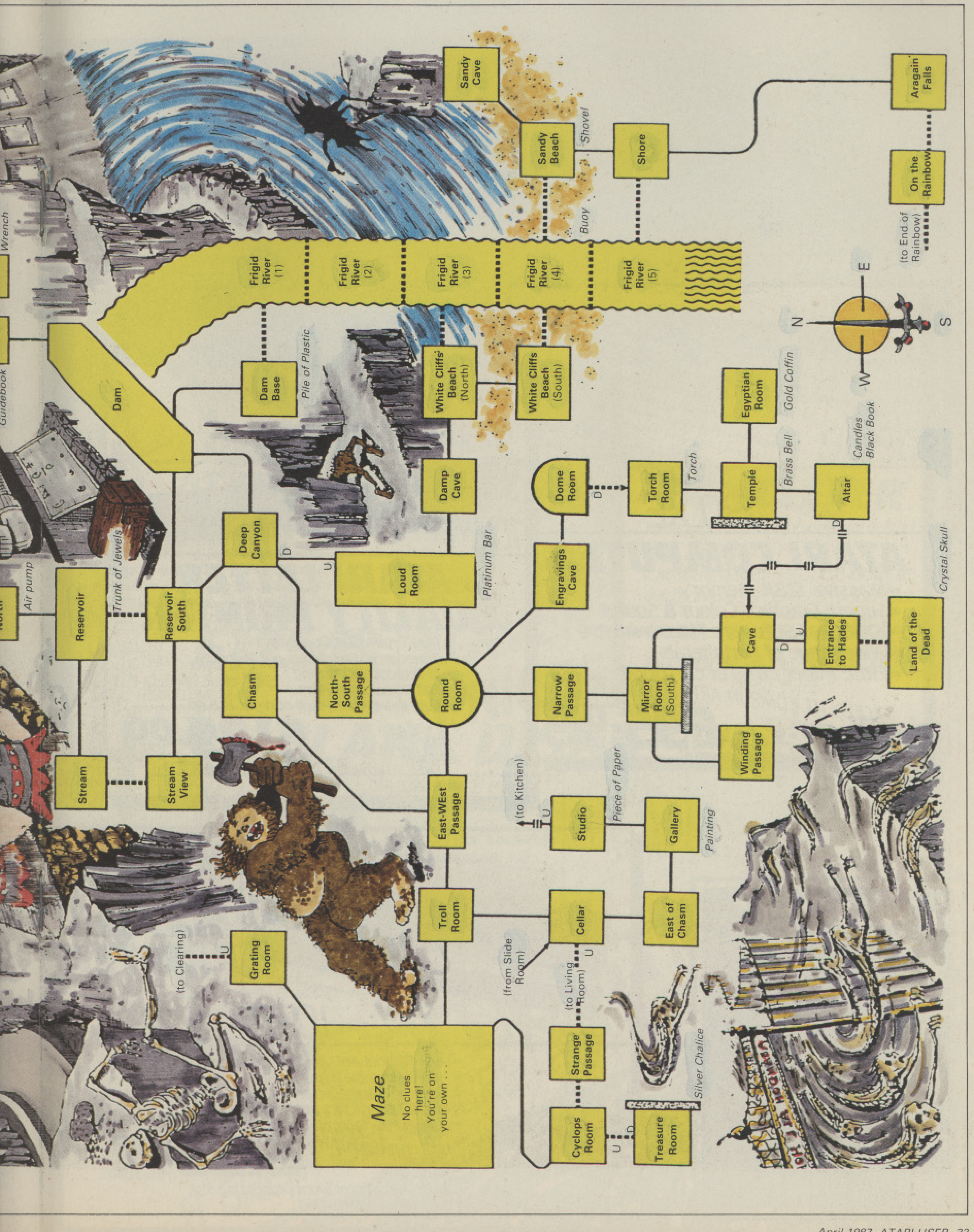
This was discovered by using a machine code dissassembler program, and it is likely that this Open Sesame-style code was left in by the developers to assist with speedy debugging of returned faulty or corrupt discs.

Obviously no one playing the games was ever expected to type such odd words, so now if you're really stuck on an Infocom offering you can virtually find the complete solution. What a boon for solving those really tricky puzzles like the Babel Fish.


ZORK I
First of a great new series of adventure maps
the great underground empire
Forest (4)
Forest (2)
Clearing
Forest (3)
Canyon View
Rocky Ledge
Canyon Bottom
End of Rainbow
(to On the Rainbow)
D
U
(to Forest 1)
Behind House
Clearing
Pile of Leaves
Up a tree
Jewel-Encrusted Egg
Bird's Nest
Forest Path
(to Grating Room)
North of House
Attic
Kitchen
Glass Bottle
Brown Sack
(from Studio)
Rope
Nasty Knife
Living Room
Trophy Case
Lamp
Sword
(to Cellar)
House
(to Strange Passage)
South of House
West of House
Forest (1)
(to Forest 3)
Stone Barrow
Inside the Barrow
To Zork II
N
E
S
W
ATARI USER



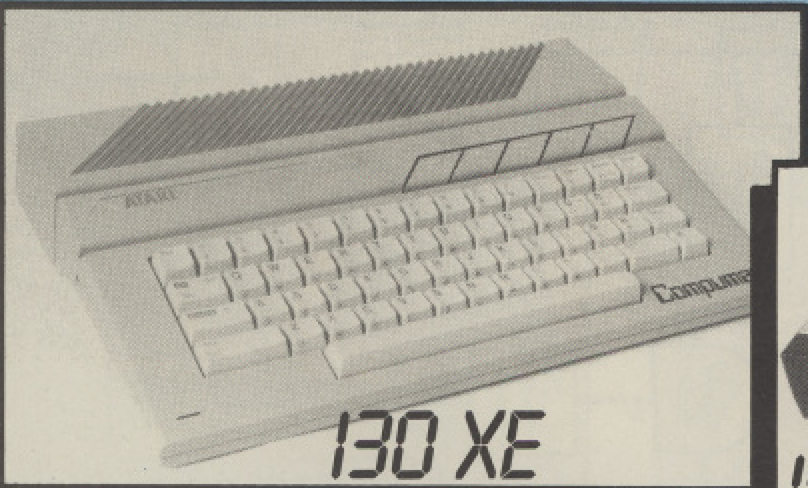
KEY
Normal passageway
One-way passageway
Passageway requiring special equipment or problem-solving
Narrow passageway (baggage limit)
Passageway returning to room of origin
Coal Mine
Coal Mine (1)
Coal Mine (2)
Coal Mine (3)
Coal Mine (4)
U
D
Ladder Top
Ladder Bottom
Dead End
Coal
Timber Room
Timber
Gas Room
Smelly Room
Shaft Room
Basket
Sapphire Bracelet
Drafty Room
Machine Room
Maintenance Room
Tool Chest
Tube
Screwdriver
Wrench
Dam Lobby
Matchbook
Guidebook
Crystal Trident
Atlantis Room
Reservoir North
Air pump
Cave
Cold Passage
Mirror Room (North)
Twisting Passage
Mine Entrance
Slide Room
(to Cellar)
Bat Room
Jade Figurine
Squeaky Room


Sandy Cave
Sandy Beach
Shovel
Shore
Aragain Falls
On the Rainbow
(to End of Rainbow)
Buoy
Wrench
Frigid River (1)
Frigid River (2)
Frigid River (3)
Frigid River (4)
Frigid River (5)
Guidebook
Dam
Dam Base
Pile of Plastic
White Cliffs Beach (North)
White Cliffs Beach (South)
N
E
S
W
Egyptian Room
Gold Coffin
Candles
Black Book
Brass Bell
Torch
Damp Cave
Dome Room
Torch Room
Temple
Altar
Air pump
Reservoir North
Reservoir
Trunk of Jewels
Reservoir South
Deep Canyon
Loud Room
Platinum Bar
Engravings Cave
Crystal Skull
Cave
Entrance to Hades
Land of the Dead
Chasm
North-South Passage
Round Room
Narrow Passage
Mirror Room (South)
Winding Passage
Stream
Stream View
East-WEst Passage
(to Kitchen)
Studio
Piece of Paper
Gallery
Painting
Troll Room
Cellar
East of Chasm
(to Clearing)
Grating Room
(from Slide Room)
(to Living Room)
Maze
No clues here! You're on your own . . .
Strange Passage
Silver Chalice
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Treasure Room
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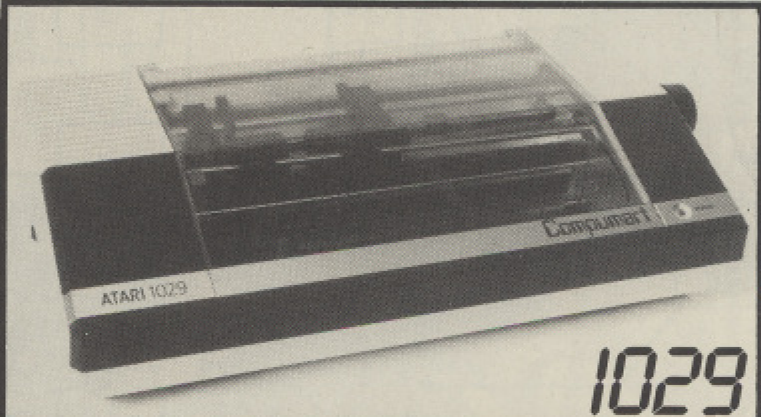


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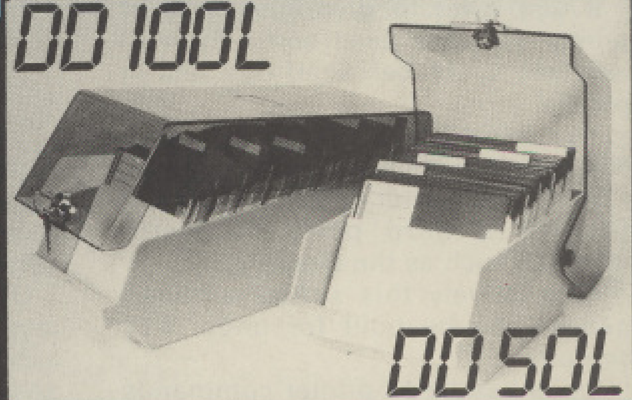
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Build your own Epson interface

Part 10 of LEN GOLDING's series on using your Atari to control devices

EPSON printers have always been recommended by Atari as an alternative to their own own low-cost and relatively limited machines. But they, together with Epson-compatible types produced by other manufacturers, all suffer from one big disadvantage – you can't plug them into the Atari's serial port with your other peripherals.

If you want to drive this kind of printer you will need some form of interface which can send out data in parallel form.

You could pay out £99 for an Atari 850 interface module (plus a further £20 for the printer cable), or around £60 for a third party hardware interface such as the Graphix.

Alternatively this software-driven gadget can be built for under £12 complete.

It will handle all printer commands (LPRINT, LIST "P:" and so on) just like a hardware interface, but it needs no separate power supply and very little can go wrong with it.

The driver program, written entirely in machine code, loads and runs automatically on power-up and it is System Reset proof so you can forget all about it once it's loaded into ram.

Unlike some commercially available joystick printer interfaces, this one leaves page 6 free and it will work with any language cartridge, including AtariWriter.

Let's look at the hardware first. You will need two joystick extension cables and a 36-way Centronics-type plug with solder terminals – not the insulation displacement (IDC) type. Test the cables first, using a standard joystick, then cut them to a length of 1.5 metres or less, and discard the socket ends.

	Joystick pin	Joystick function	Centronics pin	Printer function
JOYSTICK 0	1	BIT 0	2	DATA 1
	2	BIT 1	3	DATA 2
	3	BIT 2	4	DATA 3
	4	BIT 3	5	DATA 4
	5	POT B	—	—
	6	STRIG0	11	BUSY
	7	+5V *	—	—
	8	OV	16	GROUND
	9	POT A	—	—
JOYSTICK 1	1	BIT 4	6	DATA 5
	2	BIT 5	7	DATA 6
	3	BIT 6	8	DATA 7
	4	BIT 7	1	STROBE
	5	POT B	—	—
	6	STRIG1	32	FAULT
	7	+5V *	—	—
	8	OV	33	GROUND
	9	POT A	—	—
	—	—	9 **	DATA 8
	—	—	30	GROUND

* Not used unless buffer board fitted
** Connect permanently to ground at pin 30

Table I: Connecting the joystick leads to the printer's Centronics plug

Table 1 shows how everything should be connected together to suit Epson and other compatible printers. Remember to link Centronics pin 9 to pin 30 inside the plug.

Soldering this type of connector can be a bit fiddly, and it is a good test of soldering skill. If you don't fancy doing it yourself you can buy a ready built and tested cable assembly from RH Design for not much more than its component parts would cost.

The software is less than 150 bytes long but is quite complicated to understand, so unless you're happy with machine code you can ignore programs 1A and 1B, and skip straight to our discussion of the Basic listings.

Still with us? OK, the interface works by inserting a new printer handler which intercepts the normal OS routine and diverts all output to the joystick ports, where it appears in parallel form.

Adding a new handler is fairly straightforward and is being covered in more detail in Andre Willey's series on using CIO – See page 14.

When the computer is instructed to print a block of data to the printer, CIO sends out one byte at a time via the 6502 Accumulator. Thus at the start of the PUTBYTE routine, register A will contain the next character to be printed, as provided by CIO.

PUTBYTE first checks that the printer is ready to receive data, by looking at the Busy line (STRIG0). If it is high (5 volts) it means the printer is working on some other task, so the routine pauses until STRIG0 goes low again.

Then it checks to see whether the character in register A is an Atari end-of-line (155), and if so translates it into the normal Ascii Carriage Return (code 13). This code instructs the printer to start printing the characters in its buffer and also produces a line

```
05 ;PROGRAM 1A: PRINTER INTERFACE - DISK VERSION
10 CR=$0D
20 DOSINI=$0C
30 EOL=$9B
40 HATABS=$31A
50 LOADADR=$1D00
60 MEMLO=$2E7
70 PACTL=$D302
80 PORTA=$D300
90 STRIG0=$D010
0100  *=LOADADR
0110 ;
0120 ;Header is added automatically on assembly
0130 ;Format is: 255,255,Load Address, end Address
0140 ;
0150 INIT
0160  LDA DOSINI      Force the original value
0170  STA WARMST+1    held in DOSINI into the
0180  LDA DOSINI+1    operand of JSR OLDINIT
0190  STA WARMST+2
0200  JMP WMST2
0210 ;
0220 WARMST
0230  JSR OLDINIT
0240 WMST2
0250  LDA #FINISH&255  Reset MEMLO to reserve
0260  STA MEMLO        a protected area at
0270  LDA #FINISH/256  the low end of RAM.
0280  STA MEMLO+1
0290  LDA #WARMST&255  Change the value in
0300  STA DOSINI       DOSINI to ensure that
0310  LDA #WARMST/256  SYSTEM RESET won't
0320  STA DOSINI+1     destroy the interface.
0330  LDA #NEWTAB&255  Change the printer handler
0340  STA HATABS+1     address in HATABS, so
0350  LDA #NEWTAB/256  that it points to our new
0360  STA HATABS+2     handler table at NEWTAB.
0370 OLDINIT
0380  RTS
0390 ;
0400 NEWTAB
0410 ;This table contains the addresses of our new handler routines
0420  .WORD OPEN-1
0430  .WORD CLOSE-1
0440  .WORD GETBYTE-1
0450  .WORD PUTBYTE-1
0460  .WORD GETSTAT-1
0470  .WORD SPECIAL-1
0480 ;
0490 ;New handler routines start here
0500 ;
0510 OPEN
0520  LDX #0
0530 PRTEST
0540  LDA STRIG0     Check Busy line
0550  BEQ PROK       If low, printer is connected
0560  DEX            If not, try again up to 256
0570  BNE PRTEST     times and if still no joy
0580  LDY #$8A       generate error code 138
0590  RTS            then abort.
0600 PROK
0610  LDX #$FF       All joystick pins to be outputs
0620  JMP PORTSET
0630 ;
0640 CLOSE
0650  LDX #$0        All joystick pins to be inputs
0660 PORTSET
0670  LDA #$38       Configure joystick ports
0680  STA PACTL
0690  STX PORTA      for input ($FF) or output ($00)
0700  LDA #$3C
0710  STA PACTL
0720  LDA #$80
0730  STA PORTA
0740  LDY #1         Tell CIO all OK
0750  RTS
0760 ;
0770 PUTBYTE
0780   LDX STRIG0    Wait for 'Busy' to clear
0790   BNE PUTBYTE
0800   CMP #EOL      If character is Atari End-of-Line
0810   BNE PB1
0820   LDA #CR       change it to an Epson Carriage Return
0830 PB1
0840  ORA #$80       Make sure Strobe is high
0850  STA PORTA      Send character to joystick ports
0860  JSR DELAY      Wait a few microseconds
0870  AND #$7F       Send Strobe low
0880  STA PORTA
0890  NOP            for about 1 microsec
0900  ORA #$80       Then send it high again
0910  STA PORTA
0920  LDY #1         Tell CIO all OK
0930  RTS
0940 ;
0950 ;The following functions are not implemented:
0960 ;
0970 GETBYTE
0980 GETSTAT
0990 SPECIAL
1000  LDY #$92       Generate error code 146
1010 DELAY
1020  RTS
1030 ;
1040 FINISH
1050  *=$2E0
1060  .WORD INIT     Insert disk initialisation address
```

Program IA: Printer Interface, Disc version

feed, provided you have selected 'automatic line feed' on its internal DIP switches.

Sending the character to the joystick ports is easy – we just store it at PORTA ($D300), whereupon bits 0 to 3 appear at port one, and bits 4 to 7 at port two, as shown in Table 1.

The printer won't actually do anything with the data until its strobe line goes low, and here we have a problem. Only eight output lines are available from the two joystick ports, and we need them all to carry an eight bit character. So what can we connect the strobe line to?

The answer is that we cheat, by stealing the eighth bit (bit 7) from the character, and connecting it to the Strobe line. Since normal characters use only bits 0 to 6 (Ascii codes 0 to 127), this doesn't matter for most purposes.

By masking bit 7 on or off we can now send the strobe line high or low at will, without affecting the character data. The printer expects to receive eight-bit characters so we can't just ignore its Data-8 line. Instead we connect it permanently to ground via Centronics pin 30. The printer therefore sees an eight-bit character whose eighth bit is always low.

Back to the source listing. PB1 first makes sure that bit 7 is high, then sends all eight bits to the joystick ports. JSR DELAY wastes about six microseconds, which gives the data lines plenty of time to stabilise, then bit 7 is switched off, sending the strobe line low, and the printer responds by loading the character into its buffer.

```
05 ;PROGRAM 1B: PRINTER INTERFACE - CASSETTE VERSION
10 CR=$0D
20 DOSINI=$0C
30 EOL=$9B
40 HATABS=$31A
50 MEMLO=$2E7
60 PACTL=$D302
70 PORTA=$D300
80 SECTORS=FINISH-LOADADR+127/128
90 LOADADR=$700
0100 STRIG0=$D010
0110  *=LOADADR
0120 ;
0130 HEADER
0140  .BYTE 0        Boot file format
0150  .BYTE SECTORS
0160  .WORD LOADADR
0170  .WORD WARMST
0180 ;
0190 INIT
0200  LDA #$3C        Stop cassette motor
0210  STA PACTL
0220  CLC             Indicate successful boot
0230  RTS
0240 ;
0250 WARMST
0260  LDA #FINISH&255  Reset MEMLO to reserve
0270  STA MEMLO        a protected area at
0280  LDA #FINISH/256  the low end of RAM
0290  STA MEMLO+1
0300  LDA #NEWTAB&255  Change the printer vector
0310  STA HATABS+1     in HATABS so that it points
0320  LDA #NEWTAB/256  to our new list of handler
0330  STA HATABS+2     routines at NEWTAB
0340  RTS
0350 ;
0400 NEWTAB
0410 ;Lines 410-1040 as per disk version
```

Program IB: Printer Interface, Cassette version

After a further six microseconds the strobe line is sent high again, and the routine exits to CIO, using the Y register to indicate a successful data transfer.

This process continues until all the data has been printed, then CIO calls the CLOSE routine and hands control back to Basic, or whatever other language cartridge is installed.

Program 1B shows the alternative initialisation code for the cassette version. It's different from the disc code because we will be using autoboot format to load the interface program. This ensures that it is invisible to the user, loads rapidly, doesn't need to occupy page 6, has no worries about memory size and can be used with any language cartridge. Also it looks more professional that way.

In both versions, the code ahead of NEWTAB contains initialisation routines which make sure the program loads correctly into a safe area of ram, and is System Reset proof.

The cassette version uses a standard autoboot format, so the run address is contained in a header, and the Atari's own boot handler protects the code against System Reset.

More information on autobooting in general is contained in the article on autorunning Basic programs on page 14.

The disc version loads into an AUTORUN.SYS file, which is a lot friendlier and easier to handle than a disc autoboot. With this system the header is different, and extra code is needed to protect the interface program against System Reset.

Also the disc version needs to insert a run address during the load process, and this appears as a footer after FINISH. The code from NEWTAB to FINISH is identical in both versions.

The cassette version loads into ram at $700 (1792 decimal), but the disc version has to leave room for Dos and a few other things, so it starts at $1D00 (7424 decimal).

If you have an assembler you can put the program anywhere you like in ram, but once assembled the code is not re-locatable.

That's the end of our machine code interlude. Basic programmers can re-join us now. Programs II and III are completely self-contained. They need to be RUN just once to create the appropriate autoload file, and can then be discarded.

Bear in mind that machine code has to be typed in absolutely correctly or it will probably lock up the computer. Always be sure to SAVE a temporary copy before you try to RUN it.

For the disc version, insert a disc which doesn't already contain an AUTORUN.SYS file, then type RUN and hit Return. The file will be created in a few seconds, and it will load and run automatically whenever you switch on with that disc inserted.

To make the cassette version, insert a blank cassette which has been fully rewound, then type RUN and hit

```
6 REM PROGRAM 2: PRINTER INTERFACE - D
ISK VERSION
10 REM Creates an AUTORUN.SYS file fro
m the data which start at line 70
20 OPEN #1,8,0,"D:AUTORUN.SYS"
30 X=0
40 READ D:IF D=-1 THEN END
50 PUT #1,D:GOTO 40
60 REM Line 70 contains the header dat
a (file type, load address, end addres
s). 80 onwards contain the interface.
70 DATA 255,255,0,29,133,29
80 DATA 165,12,141,14,29,165,13,141,15
,29,76,16,29,32,44,29,169,134,141,231
90 DATA 2,169,29,141,232,2,169,13,133,
12,169,29,133,13,169,45,141,27,3,169
100 DATA 29,141,28,3,96,56,29,74,29,13
0,29,97,29,130,29,130,29,162,0,173
110 DATA 16,208,240,6,202,208,248,160,
138,96,162,255,76,77,29,162,0,169,56,1
41
120 DATA 2,211,142,0,211,169,60,141,2,
211,169,128,141,0,211,160,1,96,174,16
130 DATA 208,208,251,201,155,208,2,169
,13,9,128,141,0,211,32,133,29,41,127,1
41
140 DATA 0,211,234,9,128,141,0,211,160
,1,96,160,146,96,224,2,225,2,0,29,-1
150 REM the last six bytes are a foote
r which stores the Run address into RU
NAD (736
```

Program II: Creates an AUTORUN.SYS file on disc

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
6	9535	10	17729	20	5165
30	583	40	4681	50	2875
60	28894	70	3984	80	10891
90	10730	100	10449	110	11441
120	10723	130	11343	140	10631
150	22698				

```
6 REM PROGRAM 3: PRINTER INTERFACE - C
ASSETTE VERSION
10 REM Creates an Autoboot cassette fi
le from the data which start at line 1
60
20 BFR=(PEEK(106)-24)*256:REM reserve
a safe area at the top of RAM as a tem
porary buffer
30 FOR X=0 TO 46:READ D:POKE 1536+X,D:
NEXT X:REM Load the Autoboot creator p
rogram into page 6
40 REM Lines 40 to 60 contain the prog
ram which will create an autoboot cass
ette file.
50 DATA 104,104,133,204,104,133,203,10
4,133,206,104,133,205,162,16,169,11,15
7,66,3
60 DATA 165,203,157,68,3,165,204,157,6
9,3,165,205,157,72,3,165,206,157,73,3
70 DATA 32,86,228,96,67,58,155
80 REM Load the interface program temp
orarily into the reserved buffer space
90 X=0:RESTORE 180
100 READ D:IF D=-1 THEN 130
110 POKE BFR+X,D:X=X+1:GOTO 100
120 REM Now read the data from the tem
porary buffer into an Autoboot cassett
e file
130 OPEN #1,8,128,"C:"
140 X=USR(1536,BFR,PEEK(BFR+1)*128)
150 END
160 REM The following DATA statements
contain the printer interface
170 REM First 6 bytes are the header (
1st byte unused, number of sectors, lo
ad address, initialisation address).
180 DATA 0,1,0,7,13,7,169,60,141,2,211
,24,96,169,123,141,231,2,169,7
190 DATA 141,232,2,169,34,141,27,3,169
,7,141,28,3,96,45,7,63,7,119,7
200 DATA 86,7,119,7,119,7,162,0,173,16
,208,240,6,202,208,248,160,138,96,162
210 DATA 255,76,66,7,162,0,169,56,141,
2,211,142,0,211,169,60,141,2,211,169
220 DATA 128,141,0,211,160,1,96,174,16
,208,208,251,201,155,208,2,169,13,9,12
8
230 DATA 141,0,211,32,122,7,41,127,141
,0,211,234,9,128,141,0,211,160,1,96
240 DATA 160,146,96,-1
```

Program III: Creates an auto boot cassette

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
6	10261	10	19723	20	21121
30	21859	40	22379	50	12019
60	10982	70	4362	80	20398
90	2913	100	4320	110	5141
120	21671	130	3015	140	5780
150	836	160	17315	170	29177
180	9819	190	9909	200	10847
210	10658	220	11137	230	10540
240	2977				

Return. Press Play and Record as usual in response to the two beeps, and hit any key. The file will be written in about 20 seconds.

Whenever you want to load the interface, make sure the tape is fully re-wound then switch the computer on while holding down the Start key.

XL and XE owners should *not* hold down Option since you want Basic to be present for programming. Press Play when you hear the single beep then hit any key. When the READY prompt appears on screen your interface is loaded and ready to use.

A word now about Epson-compatible printers. This description generally means that the control codes are identical, or nearly so, to the Epson range, but the internal hardware may be very different. So occasionally you could come across a printer which won't respond correctly to the raw signal from the joystick ports.

This applies mainly to printers which have internal "pull-up" resistors less than about 3 kohms on their data lines. These can stop the output signals going low enough to be recognised as logic 0 by the printer.

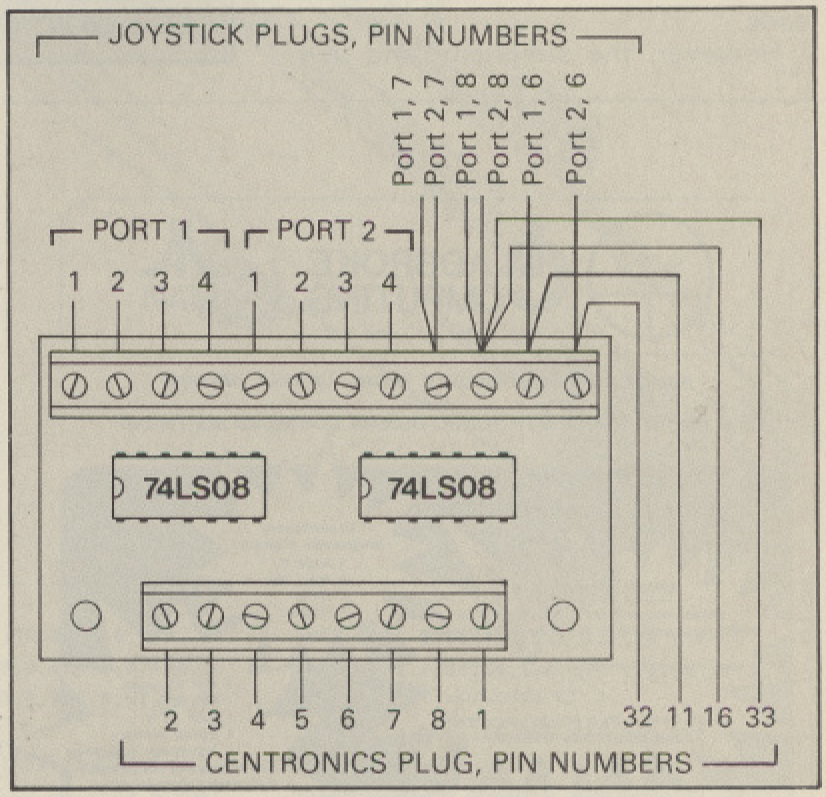


Figure II: Connecting the buffer board into the joystick leads

Most printers use pull-up resistors of 3.3 kohms or more, and this type should respond correctly. If you happen to be unlucky it's easy enough to get round the problem by using our buffer board (DBP10) to clean up the signals.

Each data line is run through an AND gate, wired as a non-inverting buffer, and this gives an unambiguous logic 1 or logic 0 output. Figure I shows the PCB pattern, in case you want to etch your own, but a ready-

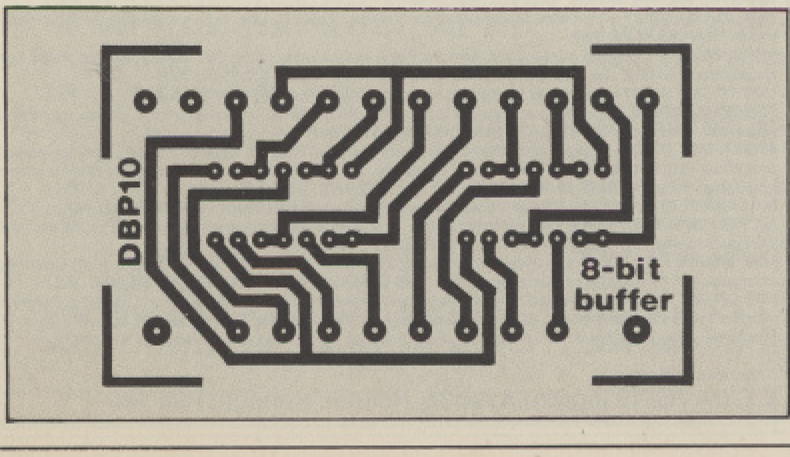


Figure I: PCB Foil pattern for printer interface buffer board

etched and drilled board is available as usual from RH Design.

Figure II shows how to construct the buffer and fit it onto the printer lead. You can dispense with the terminal blocks if you don't mind wiring directly to the PCB tracks or using veropins.

A software interface isn't as versatile as its expensive hardware counterpart, and it does have a few drawbacks. It can't handle inverse characters, since they use the eighth bit which we have commandeered for the strobe line.

This isn't a great problem because most machines can't print inverse characters anyway, but Ascii codes 128 onwards are sometimes used for italics and other special typefaces – so you'll have to sacrifice those facilities.

For the same reason, this interface can't handle graphic image data correctly. Also it won't work with commercial autoboot disc or cassette software, unless that software makes special provision for loading extra code.

However, the simplicity and low cost of this gadget make it attractive despite its limitations. It will handle the majority of home programming tasks, so you may never need to buy a hardware interface.

Even if you are planning ultimately to get an 850 module, it's worth building this as a stopgap measure, and keeping it as a backup system.

Alternatively you can easily convert the lead for permanent use with an 850 by fitting a 15 pin D-type plug (the 850 manual shows how to wire it). This saves the cost of a new printer cable and leaves you with two joystick plugs which can be used for other gadgets.

Parts required for Printer Interface

2 Joystick extension leads – available from larger Tandy stores, or most computer shops, price around £3.50 each.
1 36 way Centronics plug (solder type) eg Maplin FJ61R, price around £4.00.

A ready built and tested cable assembly is available, price £12.85 (inc. VAT and postage) from:
R H Design, 137 Stonefall Avenue, Harrogate, North Yorkshire. Tel: 0423 880520.

Parts required for Buffer Board

Qty	Part	Maplin order code
2	74LS08 AND gate chips	YF06G
2	14 pin DIL IC sockets	BL18U
1	12 way PCB terminal block (optional)	RK47R
1	8 way PCB terminal block (optional)	RK38R
1	Suitable box, eg Vero 301	LL12N

All these parts, or equivalents, are readily available from most suppliers. Cost should be around £1.60 without terminal blocks, or £3.20 with.

1 Printed circuit board (DBP10), available from RH Design, price 95p (plus 25p postage if not ordered with joystick cable assembly).

Skate Crazy

By MARK RILEY



CAN you survive all six levels of our fast and furious arcade game Skate Crazy? You control a small man on a skate board who must manouevre his way along a wall while being attacked by various flying objects.

The six walls are festooned with combinations of solid and moving blocks and moving conveyor belts, which annoyingly move your man away from the right hand end of the wall.

If you are skilful enough, the man can make use of the sky hook which moves across the top of the screen in the higher levels. It can carry him over blocks and other hazards which would otherwise be impossible.

Can you get a bonus by making it through all six levels? Can you find the hidden cheat mode which will allow you to skip the most difficult levels?

Find out by typing in Listing I. Save the program on to disc or cassette and then test it with our Get It Right! checksum program.

Alternatively, you can download Skate Crazy from MicroLink. Happy skate boarding!

```
1 REM SKATE CRAZY
2 REM BY MARK RILEY
3 REM COPYRIGHT (C) ATARI USER,1987
4 REM
10 CLR
15 POKE 16,64:POKE 53774,64
100 MO=PEEK(106)-16:POKE 106,MO:GRAPHI
CS 0
110 POKE 752,1:POKE 82,0:SETCOLOR 4,6,
5:SETCOLOR 2,6,5
120 DL=PEEK(560)+PEEK(561)*256
130 POKE DL+10,7:POKE DL+14,6:POKE DL+
17,16+6:POKE 54276,4
140 ? "↓↓↓↓↓   SkaTe cRazY"
150 ? "↓↓                         by ma
rk riley"
160 ? "↓↓        ATARI USER"
170 ? "↓↓
        COPYRIGHT  1987"
180 POKE 82,2
1000 DATA 0,0,0,0,120,252,212,254,207,
240,252,120,248,220,158,135,195,255,25
5,126,56,56,0,0,0,34,85,34,0,0,0,0
1020 DATA 0,0,0,0,0,0,0,0,0,0,0,120,25
2,254,255,255,255,255,0,0,0,0,62,63,62
,34,85,34,0,0,0,0
1040 POKE 54279,MO+8:POKE 53277,3
1050 MY=1719:FOR A=0 TO 31:READ B:POKE
 MY+A,B:NEXT A
1060 MY=1751:FOR A=0 TO 31:READ B:POKE
 MY+A,B:NEXT A
1100 POKE 706,175:POKE 704,92:POKE 705
,40:POKE 707,30
1110 POKE 53260,85
2000 DATA 255,87,87,255,255,117,117,25
5
2010 DATA 60,255,235,235,235,235,255,6
5
2020 DATA 125,125,125,125,125,125,125,
125
2030 DATA 170,255,171,174,186,234,255,
170
2040 DATA 0,0,0,192,243,127,29,0
2050 DATA 0,0,3,207,253,116,16,0
2055 DATA 0,20,213,244,112,16,0,0
2060 DATA 170,170,170,170,170,54,70,14
7
2070 DATA 255,255,235,235,235,235,255,
255
2080 DATA 0,0,0,255,0,0,0,255
2090 DATA 234,186,174,171,171,174,186,
234
2100 DATA 170,170,170,255,255,170,170,
170
2105 DATA 171,174,186,234,234,186,174,
171
2110 DATA 238,136,232,40,238,0,0,0
2120 DATA 151,146,242,146,151,0,0,0
2125 DATA 96,96,96,96,96,248,254,254
2126 DATA 255,105,190,105,105,190,105,
255
2127 DATA 213,117,93,87,213,117,93,87
2130 MY=MO*256
2140 FOR A=0 TO 143:READ B:POKE A+MY+(
```

→

```
59*8),B:NEXT A
2150 FOR A=0 TO 464:POKE A+MY,PEEK(A+5
7344):NEXT A
3000 DATA 104,104,133,2,104,133,1,104,
133,4,104,133,3,104,133,5,104,170
3010 DATA 160,0,224,0,240,17,177,1,145
,3,200,202,192,0,208,242,230,4,230,2
3020 DATA 76,150,6,169,0,197,5,240,5,1
98,5,76.24,6,96
3030 FOR A=0 TO 52:READ B:POKE A+1666,
B:NEXT A
3500 DATA 104,56,173,247,6,233,4,201,4
6,208,2,169,198,141,2,208,141,247,6,56
,169,246.237,247,6,141,248,6,96
3510 DATA 104,238,249,6,173,249,6,201,
8,16,4,141,250,6,96,201,15,16,1.96,24,
169,22,237,249,6,141,250,6
3520 DATA 201,0,208,3,141,249,6,96
3530 DATA 104,173,251,6,206,251,6,141,
4,212,201,0,208,5,169,7,141,251,6,96
3540 DATA 104,169,0,160,0,153,0,44,153
,0,45,192,255,240,4,200,76,91,6,96
3550 DATA 72,169,50,141,10,212.141,24,
208,169,14,141,10,212,141,23,208,169,0
,141,77,0,104,64
3570 FOR A=1536 TO 1665:READ B:POKE A,
```



```
B:NEXT A
3810 DATA 60,126,255,0,255,255,126,60
3820 DATA 153,153,153,153,255,126,8,8,
4,34,20,8
3830 DATA 24,60,126,255,219,153,153,25
5,102,126,66,90,60,24
3840 POKE 1629,MO+14:POKE 1632,MO+15:A
=USR(1622):POKE 1629,MO+11:A=USR(1622)
:POKE 1629,MO+12:POKE 1632,MO+13:A=USR
(1622)
3850 MY=(MO+14)*256:FOR A=0 TO 7:READ
B:POKE A+MY+104,B:NEXT A
3860 MY=(MO+15)*256:FOR A=0 TO 11:READ
B:POKE A+MY+68,B:NEXT A
3870 MY=(MO+11)*256:FOR A=0 TO 27 STEP
2:READ B:POKE A+MY+140,B:POKE A+MY+14
1,B:NEXT A
4000 GRAPHICS 12:POKE 756,MO:POKE 752,
1:POKE 559,0:POKE 623,48:POKE 512,106:
POKE 513,6:POKE 54286,192
4005 POKE 16,64:POKE 53774,64
4010 FOR A=13 TO 18
4020 POSITION 0,A:? #6;"[[[[[[[[[[[[[
[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[["
4030 NEXT A
4035 POSITION 0,19:? #6;"[[[[[[[[*****
*****************************************"
4040 POSITION 0,3:? #6;"^^^^^^^^^^^^^
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^"
4050 POSITION 39,9:? #6;"\":POSITION 3
9,10:? #6;"]":POSITION 39,11:? #6;"]"
4060 DL=PEEK(560)+PEEK(561)*256
4070 POKE DL+15,36:POKE DL+17,20:POKE
DL+6,2:POKE DL+25,198:POKE DL+24,5
4080 POSITION 0,1:? #6;"ATARI USERATAR
I USERATARI USERATARI USER"
4100 SETCOLOR 1,8,5:SETCOLOR 2,0,10:SE
TCOLOR 3,0,15:SETCOLOR 0,2,5
5000 LE=1:SC=0:LI=4
5010 ? "K↓                    LIVES
                ";HI:? "↑↑"
5070 POKE 54277,7:POKE 54276,0:HO=0:IF
 LE=2 OR LE=5 THEN HO=1
5072 IF LE=6 THEN HO=2
5075 POSITION 0,12:? #6;"[[[[[[[[[[[[
[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[["
5080 IF LE>2 THEN POSITION 0,12:? #6;"
,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,"
5090 POSITION 0,11:? #6;"      ::     :
:     ::     ::     ::"
5095 IF HO=1 THEN POSITION 0,11:? #6;"
  ¬/\            ¬/\          ¬/\    "
5100 POSITION 0,6:? #6;"
                                "
5110 IF LE>3 THEN POSITION 0,6:? #6;"
         ||    ||                    |"
5114 POSITION 0,9:? #6;"
                                "
5115 IF HO=2 THEN POSITION 0,9:? #6;"
                 ***          ***"
5120 ? "↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑";:FO
R A=1 TO LI:? "\";:NEXT A:? " "
5130 ? "↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
↑↑";SC
5900 D=0:X=48:Y=92:JM=0:POKE 1785,0:PO
KE 1787,7:POKE 1783,198
5910 POKE 559,62
5920 A=USR(1622)
5950 FOR A=0 TO 3:POKE A+53252,0:NEXT
A
6000 IF JM=0 AND STRIG(0)=0 THEN JM=1
6010 IF JM=1 THEN Y=Y-4:IF Y=92-16 THE
N JM=2:W=9
6020 IF JM=2 THEN W=W-1:IF W=0 THEN JM
=3
6030 IF JM=3 THEN Y=Y+4:IF Y=92 THEN J
M=0
6031 D=-( NOT D):IF JM<>0 THEN D=0
6035 A=USR(1666,1719,(MO+12)*256+Y+D,3
2):A=USR(1666,1751,(MO+13)*256+Y+D,32)
6040 JY=15:IF JM=0 THEN JY=STICK(0)
6041 IF LE>2 AND JY=15 AND JM=0 THEN J
Y=11
6042 IF JM=2 AND X=PEEK(1784) THEN JY=
7
6043 IF JY=11 AND X>48 THEN X=X-4
6044 IF JY=7 THEN X=X+4
6045 POKE 53248,X:POKE 53249,X
6049 IF LE>2 THEN A=USR(1602)
6050 IF HO<>1 THEN A=USR(1565):POKE 54
277,7-PEEK(1786)
6070 A=USR(1536):IF HO<1 THEN POKE 178
4,200
6080 POKE 53251,PEEK(1784):POKE 53278,
0:SOUND 0,PEEK(1783),8,5:SOUND 1,(92-Y
)*10,10,10
6090 IF X=200 THEN 7000
6100 IF PEEK(53252) OR PEEK(53260)-2<>
0 THEN 7100
6110 IF PEEK(53279)=0 THEN 7000
6120 GOTO 6000
7000 SC=SC+1000:LE=LE+1:IF LE=7 THEN 7
030
7010 SOUND 1,0,0,0:FOR A=0 TO 20 STEP
0.5:SOUND 0,A,10,10:NEXT A:SOUND 0,0,0
,0
7020 GOTO 5070
7030 SOUND 1,0,0,0:FOR G=0 TO 20
7050 ? "↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
↑↑";SC:SC=SC+1000
7060 FOR S=0 TO 10:SOUND 0,5,10,10:NEX
T S:NEXT G:SOUND 0,0,0,0
7065 IF LI<4 THEN LI=LI+1
7070 LE=1:GOTO 5070
7100 POKE 53255,116:POKE 53254,120:POK
E 53253,124:POKE 53252,128
7110 LI=LI-1:SOUND 1,0,0,0
7120 IF LI=0 THEN 7200
7130 FOR A=15 TO 0 STEP -0.1:SOUND 0,1
0,10,A:NEXT A
7140 GOTO 5120
7200 ? "↑↑    GAME OVER              ↓ ";
7210 IF SC>HI THEN HI=SC:? "↓↓↓↓↓↓↓↓↓↓
↓↓↓↓↓↓↓↓↓↓";HI
7220 FOR A=15 TO 0 STEP -1:FOR B=0 TO
10:SOUND 0,B,8,A:NEXT B:NEXT A
7230 IF STRIG(0)=1 AND PEEK(53279)<>6
THEN 7230
7240 GOTO 5000
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	7159	2	7954	3	17128
4	871	10	882	15	4449
100	7099	110	9650	120	4453
130	9754	140	4943	150	6503
160	3488	170	7077	180	1794
1000	15681	1020	13028	1040	5100
1050	8677	1060	8661	1100	8459
1110	2351	2000	5517	2010	5478
2020	5561	2030	5616	2040	4210
2050	4195	2055	4381	2060	5475
2070	5621	2080	3906	2090	5631
2100	5565	2105	5611	2110	4660
2120	4688	2125	4976	2126	5552
2127	5064	2130	1877	2140	8372
2150	8349	3000	9754	3010	10453
3020	7468	3030	7458	3500	15503
3510	14617	3520	4770	3530	10581
3540	10170	3550	13063	3570	7514
3810	5005	3820	6488	3830	8430
3840	20542	3850	10419	3860	10158
3870	14464	4000	17185	4005	4449
4010	2409	4020	16580	4030	1329
4035	7317	4040	15365	4050	13480
4060	4453	4070	11911	4080	20311
4100	11531	5000	2722	5010	7365
5070	10056	5072	3080	5075	15843
5080	14579	5090	12799	5095	8519
5100	7138	5110	8814	5114	6503
5115	8310	5120	8567	5130	4263
5900	9670	5910	1973	5920	2007
5950	6214	6000	5728	6010	8027
6020	6633	6030	6747	6031	5406
6035	11824	6040	5494	6041	6822
6042	6368	6043	5067	6044	3396
6045	4537	6049	4398	6050	8739
6070	7141	6080	13956	6090	3007
6100	7635	6110	4396	6120	1858
7000	6441	7010	12987	7020	1884
7030	4831	7050	6127	7060	10487
7065	3724	7070	2790	7100	10390
7110	3736	7120	2920	7130	7982
7140	1867	7200	6059	7210	6625
7220	11360	7230	7147	7240	1856

win £25 Send your five-liners in to us at: Atari User, Five-liners, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

LANDSCAPE SCROLLER

from JEFF DAVIES

OUR five liner this month will allow you to use scrolling landscapes for a 3D effect in your games.

The routine produces an effect that has been utilised in a number of commercial games – a landscape scrolling towards the viewer adds a sense of movement to the display.

The machine code portion of the program resides in page 6 of memory and sets up a vertical blank interrupt. The vertical blank routine automatically changes the design of the character representing Control+A.

Since the display list has been modified, you should not alter DL+24 onwards.

The Control+A character is changed into a single horizontal bar which is then scrolled downwards in its block of character set memory, as shown in Figure I. The lower quarter of the screen is POKEd with these characters and the 3D effect is achieved.

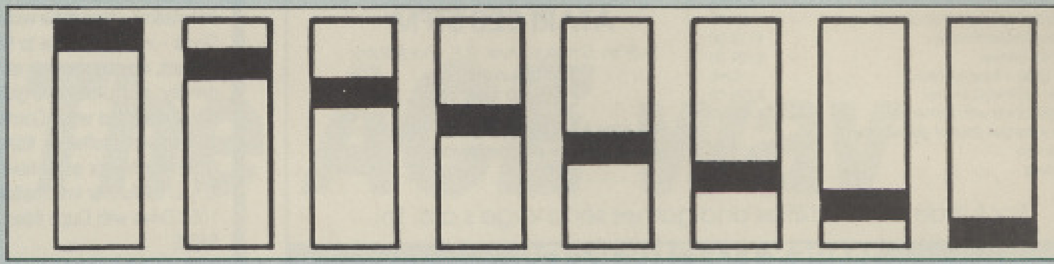


Figure I

Some joystick control is possible by altering line 4, but had to be limited to obtain a small program. If the 26th and 27th values in line 4 (50 and 240) are changed to 14 and 208, scrolling is achieved by forward movement of the joystick. The third value in line 6 determines scrolling speed. The higher the value, the slower the scroll.

If any of you can design a Basic game around this routine, why not send it in for consideration for publication?

Get it right!

LINE CHSUM	LINE CHSUM	LINE CHSUM
1 18775	2 16642	3 16615
4 16558	5 16665	6 16547

```
1 FOR X=0 TO 166:READ D:POKE 1552+X,D:NEXT X:POKE 708,164:POKE 709,162:A=USR(1552):DATA 104,173,48,2,133,176
2 DATA 173,49,2,133,177,160,24,162,4,189,167,6,145,176,200,202,16,247,160,4,177,176,24,105,32,133,178,200,177,176
3 DATA 105,3,133,179,160,0,169,65,145,178,200,192,161,208,247,162,6,160,103,169,7,32,92,228,169,172,141,0,2,169
4 DATA 6,141,1,2,169,192,141,14,212,162,7,189,159,6,157,8,6,202,16,247,96,173,120,2,201,50,240,45,206,158,6,173
5 DATA 158,6,208,37,162,0,189,8,6,157,0,6,232,224,8,208,245,162,0,189,0,6,157,9,6,232,224,7,208,245,189,0,6,141,8
6 DATA 6,169,2,141,158,6,76,98,228,2,170,170,170,85,85,85,85,85,5,5,4,4,130,72,169,4,141,10,212,141,9,212,104,64
```

The ACE way to design your own characters

START OF A NEW SERIES

STEPHEN WILLIAMSON shows how to create your own custom-built character set

HAVE you ever wanted to create Olde Worlde script to add atmosphere to your adventures? Or design graphics characters for games (the popular wargame Eastern Front uses a map made up entirely from redefined characters)?

Now you can, both quickly and easily, with my Advanced Character Editor (ACE) program – a comprehensive tool for redefining all or part of the Atari character set.

ACE is in three parts. Part 1, the main program section, is listed this month and will run as it stands. It provides a set of basic options for editing characters.

Parts 2 and 3 will be published over the next two months. These sections are in the form of subroutines to be added to the main program. The full three part program uses most of the Atari's available ram, so will only operate on machines with a mimimum of 48k.

If you are typing in the listing it is essential to use the exact line numbers as they appear in the listing, as well as entering all REM statement lines, otherwise you may experience problems when adding the next two sections.

When you have typed in the program save it to tape with the command LIST "C:" or to disc with LIST "D:ACE1". Do not use the SAVE command as this will prevent the merging of the other sections with the main program.

List ACE1 to tape or disc before running it. The Character Editor Program POKEs around a lot in the Atari's Operating System – a mistyped POKE could crash the whole machine and ruin all your hard typing work.

Part 2 will add a data command that lists the bit-mapped numbers that represent characters, as well as the facility to save and load character set data to tape, disc or printer for later inclusion in your own programs.

Part 3 is a graphic designer and animator module used to design large shapes made up of more than one redefined character. The animation section is used to create cartoon "movies" and animation sequences.

The Character Editor screen display is split into four sections called Menu, Character Set, Graphics and Pad.

The top of the screen displays the menu of valid commands. The Data, Save, Load, Animate, Colour, and Pad commands are listed in ACE Part 1, but are only used in Parts 2 and 3 of the program. If you try to access any of these commands you will not crash the program but hear a buzzer sound which is used by ACE to indicate that an invalid key has been pressed.

Commands are accessed by pressing a single key, as indicated by the inverse character at the beginning of each option.

The option currently being accessed is highlighted in inverse letters on the menu.

All prompts, information or additional commands associated with each option appear at the right hand side of the menu screen.

To exit an option press the Esc key. There are one or two exceptions to this rule, but they only occur in the Pad and Animation sections.

The next part of the screen display shows the character set. When the program is first run the character set is the standard Atari set which includes letters, numbers, punctuation, graphic symbols and other symbols such as # and +. The display does not include inverse characters.

The one exception to the standard Atari set is the symbol * which has been redefined by the program as a rectangle that acts as a cursor during the Pad module, (in Part 3 of this series). Because of this it is not recommended that you edit this symbol.

ACE supports three text modes – Graphics 0, 1 and 2. The display shows the current character in all three modes. Graphics 0 is the normal text mode on powerup with 40 characters to the line. Graphics 1 and 2 each use larger text on 20 character lines.

Graphics 1 and 2 normally support only 64 characters and exclude the lowercase and graphic symbols. Because of this, if you choose to edit a symbol excluded from Graphics 1 or 2 then that part of the display will be blank.

Graphics 0 is a one colour mode while Graphics 1 and 2 are five colour modes (four character colours and the background). The Graphics 1 and 2 characters are therefore displayed in four colours. A subroutine will be added next month to alter these colours.

The bottom section of the screen display is used in conjunction with the Pad and Animation options (in Part 3) to create multi-character designs and animated sequences.

EDITING COMMANDS

E: EDIT

The Edit command is the default mode, and when exiting from other options the program will return to Edit mode.

The current character is displayed on the right hand side of the Menu screen, with the CHR$ code shown as the AtAscii character code. When the program is first run the current character is A with an AtAscii code of 65. If you use the statement:

```
PRINT CHR$(65)
```

then the letter A will be displayed on the screen. The AtAscii code is a slight variation on the normal Ascii codes used by most computers and communcations technology.

The SC. Code shown is the screen

→

code that is associated with the PEEK and POKE commands. If you POKE this number into screen ram the appropiate character will appear. For example, switch on your Atari and type in direct mode:

POKE 40100,33

The letter A will again be displayed on the screen, since address 40100 is a location within the screen ram of a 48k machine.

There is actually another set of codes – the key handler codes – which are used solely by the keyboard handler routines, and are thus not listed here.

The edit grid in the centre of the Menu display is an enlarged version of the current character. A cursor is moved around the grid by the joystick. To edit a character, press the fire button to plot or unplot single pixel blocks on the grid.

Any changes made on the edit grid are reflected in the current character. The standard Atari design for the current character remains fixed on the menu display but the character as displayed in the character set, the graphics and, if appropiate, the Pad display will be altered.

To change the current character press key E and, when prompted, enter another character by pressing the chosen key. All characters except inverse ones will be accepted, though lowercase and control key graphic characters will not be displayed in Graphics 1 or 2.

F: FETCH

Fetch changes the current character shape to that of another character. For example, if the current character is B, then choosing character C when prompted during the Fetch option makes the shape of character B a duplicate of character C, but leaves character C intact.

I: INVERT

This option inverts the current character.

M: MIRROR

Provides a mirror image of the current character.

R: RESTORE

Restores the current character to the original Atari character set design.

W: WIPE

Clears the edit grid and erases the current character design.

Cursor keys: MOVE

Simply use the cursor keys – without pressing Control or Shift – to move the current character shape one pixel up, down, léft or right.

Now you know how to use the basic editor functions you can type in the program and start using it.

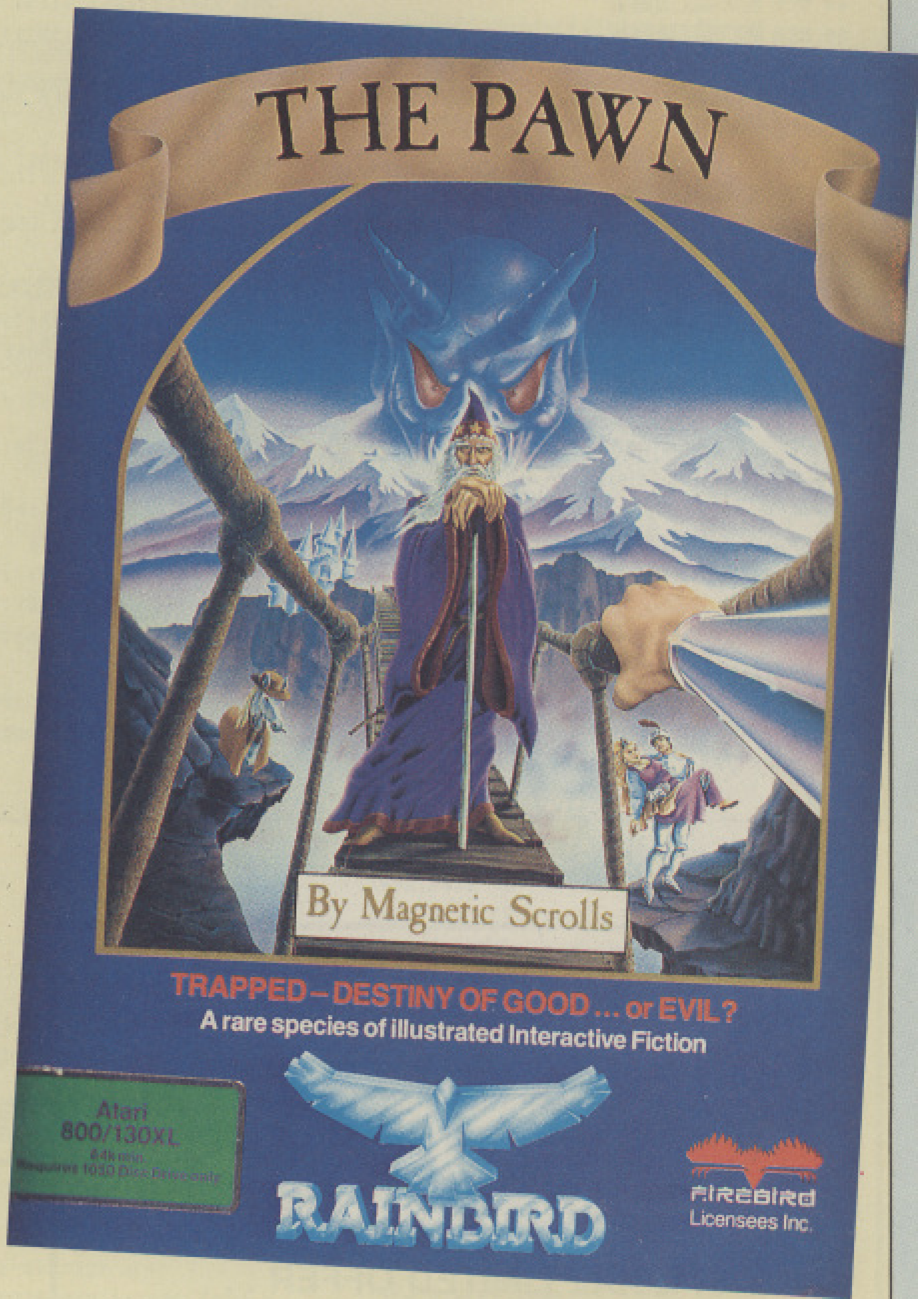
● *Next month we'll be giving you extra routines to allow you to load and save your new character sets, and also to create DATA sets for inclusion within your own Basic programs. Don't forget to order your copy of the May issue now to avoid disappointment.*

Full listing starts on Page 48

 ATARI USER MAIL ORDER OFFERS

Lose yourself in the magical world of Kerovnia!

SAVE UP TO £10



This fascinating adventure features the most sophisticated parser around: You can type complex sentences and interact with the many characters, including some very intelligent animals.

This superb package includes a 44-page novel and a cryptic help section.

"The program took three man years of programming time to produce – and it shows. The Pawn is the stuff from which cults are made."

– Anthony Ginn, writing about the Atari ST version in the May 1986 issue of the Atari User



Suitable for	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari 800/130 with minimum 64K plus 1050 double density disc drive	£19.95	£14.95	£5	£21.95	£10

TO ORDER TURN TO THE FORM ON PAGE 61

```
10 REM  ADVANCED CHARACTER EDITOR 
20 REM  for Atari User 
30 REM  by Stephen Williamson 
40 REM  ACE PART 1 
50 REM  INITIALISE 
60 DIM SP$(14),ST(8),IN$(7),SM(11)
70 DIM ORDER(10),NAME$(12),FILE$(20)
80 FOR I=0 TO 10:ORDER(I)=0:NEXT I
90 REM
100 OPEN #1,4,0,"K:":TRAP 5000
110 FOR L=0 TO 38:READ A:POKE 1740+L,A
:NEXT L
120 START=256*(PEEK(106)-28)
130 A=USR(1740,START,23):REM CLEAR SCR
EEN DATA RAM AREA
140 CHAR=65:LN=30110:FILE$="D:"
150 GRAPHICS 0:SETCOLOR 2,8,0
160 GOSUB 30000:RESTORE 580
170 SCREEN=1:SP$="            ":REM 12
 SPACES
180 POKE 752,1:REM SWITCH OFF CURSOR
190 FOR L=0 TO 62:READ A:POKE 1536+L,A
:NEXT L
200 FOR L=1 TO 7:READ A:IN$(L,L)=CHR$(
A):NEXT L
210 FOR L=0 TO 36:READ A:POKE 1700+L,A
:NEXT L
220 POKE 209,1:POKE 1548,M
230 POKE 512,0:POKE 513,6
240 POKE 54286,192:REM SWITCH ON DLI
250 SM=PEEK(88)+256*PEEK(89)
260 S=PEEK(106)-21:ST=S*256
270 FOR I=0 TO 8:SM(I+1)=ST+I*320:NEXT
 I
280 A=USR(1700):REM SWITCH ON VBI
290 B=0
300 SF=PEEK(559):POKE 559,0:REM SWITCH
 OFF SCREEN
310 CUR=SM+57:POKE CUR,84:GR=CUR:CUR1=
0
320 REM  SET UP DISPLAY LIST 
330 DLIST=PEEK(560)+256*PEEK(561)
340 FOR I=0 TO 31:POKE 1600+I,PEEK(DLI
ST+I):NEXT I
350 DLIST=1600
360 POKE DLIST+15,130:POKE DLIST+19,13
0
370 POKE DLIST+20,6:POKE DLIST+21,7
380 POKE DLIST+22,66
390 HIBYTE=INT(SM(1)/256)
400 LOBYTE=SM(1)-HIBYTE*256
410 POKE DLIST+23,LOBYTE:POKE DLIST+24
,HIBYTE
420 POKE 1650,HIBYTE:POKE 1651,LOBYTE
430 FOR I=25 TO 31:POKE DLIST+I,2:NEXT
 I
440 POKE DLIST+32,65:POKE DLIST+33,64
450 POKE DLIST+34,6
460 POKE 560,64:POKE 561,6
470 POKE 756,224
480 REM  SET UP SCREEN DISPLAY 
490 GOSUB 1630
500 GOSUB 2960
510 GOSUB 3120
520 POSITION 2,3:? "EDIT"
530 REM  CLEAR MEMORY DATA 
540 DATA 104,104,141,226,6,104,141,225
,6,104,104,141,254
550 DATA 6,160,0,162,0,169,0,157,78,36
,232,208,248,204,254,6,240
560 DATA 7,200,238,226,6,76,220,6,96
570 REM  DLI DATA 
580 DATA 72,138,72,169,0,141,10,212,14
1,24,208
590 DATA 169,156,141,9,212
600 DATA 165,209,201,2,240,8,169,2,133
,209,104,170,104,64
610 DATA 169,14,141,22,208,169,94,141,
23,208,169,52,141,24,208,169,186,141,2
5,208
620 DATA 169,0,141,26,208
630 DATA 169,1,133,209,104,170,104,64
640 REM  IO DATA 
650 DATA 104,162,16,76,86,228,96
```

```
660 REM VBI DATA
670 DATA 104,169,6,160,174,162,6,76,92
,228,173,116,6,201,1,208,17,173,114
680 DATA 6,141,87,6,173,115,6,141,88,6
,169,0,141,116,6
690 DATA 76,95,228
700 POKE 559,SF:KEY=65:GOSUB 1160:REM
SWITCH ON SCREEN
710 FOR I=0 TO 7:READ D
720 POKE CHBASE+(10*8)+I,D:NEXT I
730 DATA 255,129,129,129,129,129,129,2
55
740 REM MAIN LOOP
750 IF STICK(0)<>15 THEN POKE 77,0:GOS
UB 1360
760 POKE 694,0:POKE 702,64
770 IF PEEK(209)=2 THEN POKE 209,1:REM
 SYNCHRONISE DLI/VBI
780 POKE CUR,84:FOR DEL=1 TO 2:POKE CU
R,B
790 IF STRIG(0)=0 THEN GOSUB 1440
800 KEY=PEEK(764):IF KEY<>255 THEN GOS
UB 820
810 GOTO 750
820 REM KEY PRESSED
830 POKE 764,255:IF PEEK(209)=2 THEN P
OKE 209,1
840 IF KEY=42 THEN GOSUB 1030:GOSUB 10
70:KEY=255
850 IF KEY=46 THEN GOSUB 1030:GOSUB 18
80:KEY=255
860 IF KEY=56 THEN GOSUB 1030:GOSUB 20
60:KEY=255
890 IF KEY=40 THEN GOSUB 1030:GOSUB 28
50:KEY=255
900 IF KEY=13 THEN GOSUB 1030:GOSUB 31
90:KEY=255
910 IF KEY=37 THEN GOSUB 1030:GOSUB 33
10:KEY=255
920 IF KEY=14 THEN GOSUB 1030:GOSUB 34
90:KEY=255
930 IF KEY=15 THEN GOSUB 1030:GOSUB 36
00:KEY=255
940 IF KEY=6 THEN GOSUB 1030:GOSUB 370
0:KEY=255
950 IF KEY=7 THEN GOSUB 1030:GOSUB 388
0:KEY=255
1000 IF KEY<>255 THEN ? "W"
1010 GOSUB 2960:GOSUB 2550:POSITION 2,
3:? "EDIT":GOSUB 1630
1020 RETURN
1030 REM VALID KEY PRESSED SOUND
1040 SOUND 0,128,10,15
1050 FOR DEL=0 TO 5:NEXT DEL
1060 SOUND 0,0,0,0:RETURN
1070 REM EDIT
1080 GOSUB 2550
1090 POSITION 2,3:? "EDIT"
1100 POSITION 27,7:? "CHAR.?"
1110 POKE 764,255
1120 GET #1,KEY:IF KEY=255 THEN 1120
1130 IF KEY>154 AND KEY<160 THEN POSIT
ION 27,8:? "NCHARACTER":POSITION 27,9:
? "NOT VALID":RETURN :REM ESC/CTRL/2
1140 IF KEY>127 THEN POSITION 27,8:? "
NINVERSE NOT":POSITION 27,9:? "VALID":
FOR DEL=1 TO 100:NEXT DEL:RETURN
1150 IF KEY=27 THEN GOSUB 1030:GOSUB 2
550:RETURN
1160 CHAR=KEY
1170 GOSUB 2550
1180 GOSUB 1630
1190 GOSUB 1820
1200 REM PLOT ENLARGED CHARACTER
1210 REM IN GRID
1220 CHDAT=CHBASE+(CH*8)
1230 FOR LINE=0 TO 7
1240 DAT=PEEK(CHDAT+LINE)
1250 IF DAT-128>-1 THEN POKE GR+(LINE*
40),128:DAT=DAT-128
1260 IF DAT-64>-1 THEN POKE GR+(LINE*4
0)+1,128:DAT=DAT-64
1270 IF DAT-32>-1 THEN POKE GR+(LINE*4
0)+2,128:DAT=DAT-32
1280 IF DAT-16>-1 THEN POKE GR+(LINE*4
0)+3,128:DAT=DAT-16
1290 IF DAT-8>-1 THEN POKE GR+(LINE*40
)+4,128:DAT=DAT-8
1300 IF DAT-4>-1 THEN POKE GR+(LINE*40
)+5,128:DAT=DAT-4
1310 IF DAT-2>-1 THEN POKE GR+(LINE*40
)+6,128:DAT=DAT-2
1320 IF DAT-1>-1 THEN POKE GR+(LINE*40
)+7,128:DAT=DAT-1
1330 NEXT LINE
1340 B=PEEK(CUR)
1350 RETURN
1360 REM MOVE CURSOR
1370 ST=STICK(0)
1380 VERT=(ST=13)-(ST=14)
```



```
1390 HORIZ=(ST=7)-(ST=11)
1400 IF PEEK(CUR+(40*VERT))<>96 THEN P
OKE CUR,B:CUR=CUR+(40*VERT):B=PEEK(CUR
)
1410 IF PEEK(CUR+HORIZ)<>96 THEN POKE
CUR,B:CUR=CUR+HORIZ:B=PEEK(CUR)
1420 POKE CUR,84:POKE CUR,B
1430 RETURN
1440 REM PLOT BLOCKS IN GRID
1450 REM AND UPDATE CHARACTER DATA
1460 REM IN RAM
1470 IF PEEK(CUR)=0 THEN B=128:GOTO 14
90
1480 IF PEEK(CUR)=128 THEN B=0
1490 POKE CUR,B:FOR DELAY=1 TO 20:NEXT
 DELAY
1500 LINE=INT((CUR-GR)/40):ROW=LINE*40
+GR
1510 TOT=0:GOSUB 1030
1520 IF PEEK(ROW)=128 THEN TOT=TOT+128
1530 IF PEEK(ROW+1)=128 THEN TOT=TOT+6
4
1540 IF PEEK(ROW+2)=128 THEN TOT=TOT+3
2
1550 IF PEEK(ROW+3)=128 THEN TOT=TOT+1
6
1560 IF PEEK(ROW+4)=128 THEN TOT=TOT+8
1570 IF PEEK(ROW+5)=128 THEN TOT=TOT+4
1580 IF PEEK(ROW+6)=128 THEN TOT=TOT+2
1590 IF PEEK(ROW+7)=128 THEN TOT=TOT+1
1600 POKE CHBASE+(CH*8)+LINE,TOT
1610 RETURN
1620 REM POKE NEW CHARACTER TO SCREEN
1630 POSITION 27,5:? SP$:POSITION 27,6
:? SP$
1640 POSITION 27,5:? "CHR$ ";CHAR:POSI
TION 38,5:? CHR$(CHAR)
1650 CH=PEEK(SM+238)
1660 POSITION 27,6:? "SC.CODE ";CH
1670 POKE SM+576,CH
1680 POKE SM+580,CH
1690 POKE SM+584,CH
1700 POKE SM+588,CH
1710 IF CH>64 THEN CH=0
1720 POKE SM+607,CH
1730 POKE SM+609,CH+64
1740 POKE SM+611,CH+128
1750 POKE SM+613,CH+192
1760 POKE SM+626,CH
1770 POKE SM+628,CH+64
1780 POKE SM+630,CH+128
1790 POKE SM+632,CH+192
1800 CH=PEEK(SM+238)
1810 RETURN
1820 REM ERASE BLOCKS IN GRID
1830 FOR LINE=0 TO 280 STEP 40
1840 FOR COL=0 TO 7
1850 POKE GR+LINE+COL,0
1860 NEXT COL:NEXT LINE
1870 RETURN
1880 REM WIPE
1890 GOSUB 2960:POSITION 30,0:? "WIPE"
1900 GOSUB 2000
1910 IF KEY<>89 THEN RETURN
1920 CHDAT=CHBASE+(CH*8)
1930 GOSUB 1820
1940 FOR I=0 TO 7
1950 POKE CHDAT+I,0
1960 NEXT I
1970 GOSUB 2970
1980 B=PEEK(CUR)
1990 RETURN
2000 REM SURE Y/N
2010 POSITION 27,8:? "ARE YOU":POSITIO
N 27,9:? "SURE (Y/N)? "
2020 GET #1,KEY
2030 IF KEY<>89 THEN GOSUB 2540:GOSUB
2970
2040 GOSUB 1030
2050 RETURN
2060 REM FETCH
2070 GOSUB 2970
2080 POSITION 2,4:? "FETCH"
2090 POSITION 27,7:? "CHAR ?";
2100 GET #1,KEY
2110 IF KEY=27 THEN GOSUB 1030:GOSUB 2
550:RETURN
2120 IF KEY>127 THEN POSITION 27,8:? "
NINVERSE NOT":POSITION 27,9:? "VALID":
FOR DEL=1 TO 20:NEXT DEL:RETURN
2130 ? CHR$(KEY)
2140 COPY=PEEK(SM+313)
2150 POSITION 26,7:? SP$
```

```
2160 FOR I=0 TO 7
2170 POKE CHBASE+(CH*8)+I,PEEK(CHBASE+
(COPY*8)+I)
2180 NEXT I
2190 GOSUB 1820
2200 GOSUB 1180
2210 GOSUB 2960
2220 POSITION 2,3:? "EDIT"
2230 RETURN
2540 REM  ERASE RIGHT HAND
2550 FOR I=4 TO 10
2560 POSITION 26,I:? SP$;:POSITION 38,
I:? " ";
2570 NEXT I
2580 RETURN
2850 REM RESTORE
2860 ATBASE=57344
2870 GOSUB 2960
2880 POSITION 2,9:? "RESTORE"
2890 FOR I=0 TO 7
2900 POKE CHBASE+(CH*8)+I,PEEK(ATBASE+
(CH*8)+I)
2910 NEXT I
2920 GOSUB 1820
2930 GOSUB 1180
2940 GOSUB 2960
2950 RETURN
2960 REM  VALID COMMANDS
2970 POSITION 2,0:? "ANIMATE"
2980 POSITION 2,1:? "COLOUR"
2990 POSITION 2,2:? "DATA"
3000 POSITION 2,3:? "EDIT"
3010 POSITION 2,4:? "FETCH"
3020 POSITION 2,5:? "INVERT"
3030 POSITION 2,6:? "LOAD"
3040 POSITION 2,7:? "MIRROR"
3050 POSITION 2,8:? "PAD"
3060 POSITION 2,9:? "RESTORE"
3070 POSITION 2,10:? "SAVE"
3080 POSITION 30,0:? "WIPE"
3090 POSITION 30,1:? "-=+*MOVE"
3100 POSITION 27,3:? "SCREEN ";SCREEN
3110 RETURN
3120 REM  SCREEN DISPLAY
3130 POSITION 16,0:? "♦♦♦♦♦♦♦♦♦♦"
3140 FOR Y=0 TO 8:POSITION 16,Y:? "♦":
POSITION 25,Y:? "♦":NEXT Y
3150 POSITION 16,9:? "♦♦♦♦♦♦♦♦♦♦♦"
3160 POKE 82,0
3170 POSITION 0,11:FOR I=0 TO 26:? CHR
$(I);:NEXT I
3180 FOR I=32 TO 124:? CHR$(I);:NEXT I
:RETURN
3190 REM  INVERT
3200 CHDAT=CHBASE+(8*CH)
3210 GOSUB 2960:POSITION 2,5:? "INVERT
"
3220 FOR I=0 TO 7
3230 ST(I)=PEEK(CHDAT+I)
3240 NEXT I
3250 FOR I=0 TO 7
3260 POKE CHBASE+(8*CH)+I,ST(7-I)
3270 NEXT I
3280 GOSUB 1820
3290 GOSUB 1180
3300 RETURN
3310 REM MIRROR
3320 GOSUB 2960:POSITION 2,7:? "MIRROR
"
3330 TOT=0
3340 FOR LINE=0 TO 7:ROW=LINE*40+GR
3350 IF PEEK(ROW)=128 THEN TOT=TOT+1
3360 IF PEEK(ROW+1)=128 THEN TOT=TOT+2
3370 IF PEEK(ROW+2)=128 THEN TOT=TOT+4
3380 IF PEEK(ROW+3)=128 THEN TOT=TOT+8
3390 IF PEEK(ROW+4)=128 THEN TOT=TOT+1
6
3400 IF PEEK(ROW+5)=128 THEN TOT=TOT+3
2
3410 IF PEEK(ROW+6)=128 THEN TOT=TOT+6
4
3420 IF PEEK(ROW+7)=128 THEN TOT=TOT+1
28
3430 POKE CHBASE+(CH*8)+LINE,TOT
3440 TOT=0
3450 NEXT LINE
3460 GOSUB 1820
```

```
3470 GOSUB 1180
3480 RETURN
3490 REM  MOVE UP ONE PIXEL
3500 GOSUB 2960:POSITION 30,1:? "-=+*MOVE"
3510 CHDAT=CHBASE+(CH*8)
3520 FOR LINE=0 TO 6
3530 IF PAD=0 AND PEEK(84)=8 THEN POKE 84,0:POKE 85,0
3540 POKE CHDAT+LINE,PEEK(CHDAT+1+LINE)
3550 NEXT LINE
3560 POKE CHDAT+7,0
3570 GOSUB 1820
3580 GOSUB 1180
3590 RETURN
3600 REM  MOVE DOWN ONE PIXEL
3610 GOSUB 2960:POSITION 30,1:? "-=+*MOVE"
3620 CHDAT=CHBASE+(CH*8)
3630 FOR LINE=7 TO 0 STEP -1
3640 POKE CHDAT+LINE,PEEK(CHDAT-1+LINE)
3650 NEXT LINE
3660 POKE CHDAT,0
3670 GOSUB 1820
3680 GOSUB 1180
3690 RETURN
3700 REM MOVE ONE PIXEL LEFT
3710 GOSUB 2960:POSITION 30,1:? "-=+*MOVE"
3720 CHDAT=CHBASE+(8*CH)
3730 FOR LINE=0 TO 7:ROW=LINE*40+GR
3740 TOT=0
3750 IF PEEK(ROW+1)=128 THEN TOT=TOT+128
3760 IF PEEK(ROW+2)=128 THEN TOT=TOT+64
3770 IF PEEK(ROW+3)=128 THEN TOT=TOT+32
3780 IF PEEK(ROW+4)=128 THEN TOT=TOT+16
3790 IF PEEK(ROW+5)=128 THEN TOT=TOT+8
3800 IF PEEK(ROW+6)=128 THEN TOT=TOT+4
3810 IF PEEK(ROW+7)=128 THEN TOT=TOT+2
3820 POKE CHBASE+(CH*8)+LINE,TOT
3830 TOT=0
3840 NEXT LINE
3850 GOSUB 1820
3860 GOSUB 1180
3870 RETURN
3880 REM MOVE ONE PIXEL RIGHT
3890 GOSUB 2960:POSITION 30,1:? "-=+*MOVE"
3900 FOR LINE=0 TO 7:ROW=LINE*40+GR
3910 TOT=0
3920 IF PEEK(ROW)=128 THEN TOT=TOT+64
3930 IF PEEK(ROW+1)=128 THEN TOT=TOT+32
3940 IF PEEK(ROW+2)=128 THEN TOT=TOT+16
3950 IF PEEK(ROW+3)=128 THEN TOT=TOT+8
3960 IF PEEK(ROW+4)=128 THEN TOT=TOT+4
3970 IF PEEK(ROW+5)=128 THEN TOT=TOT+2
3980 IF PEEK(ROW+6)=128 THEN TOT=TOT+1
3990 POKE CHBASE+(CH*8)+LINE,TOT
4000 TOT=0
4010 NEXT LINE
4020 IF PAD>0 AND FLG=0 AND SHF=0 THEN CC=74
4030 GOSUB 1820
4040 GOSUB 1180
4050 RETURN
30000 REM  LOAD CHARACTER SET
30010 DIM ML$(40)
30020 M=PEEK(106)-4
30030 POKE 106,M-1
30040 CHBASE=256*(M)
30050 GRAPHICS 0:SETCOLOR 2,0,4
30060 RESTORE 30090:FOR L=1 TO 36:READ A
30070 ML$(L,L)=CHR$(A):NEXT L
30080 A=USR(ADR(ML$),M):POKE 756,M
30090 DATA 104,104,104,133,204,169,224,133,206,162,0,160,0,177,205,145,203,200,208,249
30100 DATA 164,204,208,132,204,164,206,208,132,206,232,224,5,208,232,96
30500 RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	16031	20	16186	30	17390
40	6959	50	7490	60	5117
70	5569	80	5853	90	871
100	4527	110	7556	120	4415
130	9963	140	4768	150	5035
160	4533	170	6564	180	6583
190	7534	200	7674	210	7528
220	4021	230	3769	240	5943
250	4432	260	4189	270	6619
280	5935	290	539	300	8550
310	7104	320	12921	330	5468
340	8471	350	1960	360	6573
370	5995	380	3079	390	3985
400	4723	410	8429	420	6574
430	6790	440	6357	450	2982
460	3923	470	2117	480	13629
490	1964	500	1994	510	1945
520	5663	530	11478	540	7882
550	9166	560	5041	570	6429
580	6468	590	3530	600	8126
610	11694	620	3392	630	5194
640	5510	650	4474	660	6435
670	10593	680	7761	690	2560
700	9668	710	3605	720	5456
730	5652	740	7071	750	7500
760	3956	770	10774	780	7435
790	5336	800	7485	810	1635
820	7883	830	7632	840	8418
850	8479	860	8445	890	8450
900	8426	910	8456	920	8446
930	8452	940	8049	950	8097
1000	4142	1010	11706	1020	1498
1030	14829	1040	2893	1050	4517
1060	3975	1070	4037	1080	1973
1090	5663	1100	4513	1110	2121
1120	5484	1130	20902	1140	21188
1150	8624	1160	1826	1170	1973
1180	1964	1190	1967	1200	14712
1210	12726	1220	3580	1230	2829
1240	4136	1250	8949	1260	9212
1270	9181	1280	9204	1290	9261
1300	9243	1310	9235	1320	9232
1330	2227	1340	2208	1350	1498
1360	8094	1370	2170	1380	3775
1390	3780	1400	13814	1410	12782
1420	4462	1430	1498	1440	16181
1450	16492	1460	14424	1470	6526
1480	4596	1490	7961	1500	6922
1510	3082	1520	6498	1530	6311
1540	6293	1550	6309	1560	6071
1570	6059	1580	6055	1590	6055
1600	5039	1610	1498	1620	17461
1630	7500	1640	10309	1650	2871
1660	5698	1670	2863	1680	2852
1690	2860	1700	2868	1710	3070
1720	2863	1730	3174	1740	3367
1750	3368	1760	2863	1770	3174
1780	3367	1790	3368	1800	2871
1810	1498	1820	13195	1830	4521
1840	2674	1850	3544	1860	3872

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1870	1498	1880	4041	1890	7776
1900	1928	1910	4547	1920	3580
1930	1967	1940	2092	1950	2858
1960	1345	1970	1999	1980	2208
1990	1498	2000	6660	2010	10567
2020	1876	2030	6857	2040	1940
2050	1498	2060	4361	2070	1999
2080	6145	2090	4530	2100	1876
2110	8624	2120	20963	2130	1972
2140	3385	2150	3741	2160	2092
2170	8194	2180	1345	2190	1967
2200	1969	2210	1994	2220	5663
2230	1498	2540	10295	2550	2278
2560	7696	2570	1345	2580	1498
2850	4595	2860	2205	2870	1994
2880	7708	2890	2092	2900	7519
2910	1345	2920	1967	2930	1969
2940	1994	2950	1498	2960	10021
2970	5155	2980	4909	2990	4401
3000	4383	3010	4609	3020	4975
3030	4401	3040	4954	3050	4276
3060	5276	3070	4556	3080	4600
3090	6321	3100	6166	3110	1498
3120	9997	3130	5759	3140	11262
3150	6117	3160	1784	3170	8400
3180	7366	3190	5006	3200	3648
3210	9332	3220	2092	3230	3842
3240	1345	3250	2092	3260	5080
3270	1345	3280	1967	3290	1969
3300	1498	3310	4193	3320	9336
3330	1126	3340	5930	3350	6124
3360	6035	3370	6047	3380	6067
3390	6313	3400	6305	3410	6331
3420	6361	3430	5039	3440	1126
3450	2227	3460	1967	3470	1969
3480	1498	3490	10927	3500	9833
3510	3580	3520	2828	3530	8143
3540	6845	3550	2227	3560	2804
3570	1967	3580	1969	3590	1498
3600	12812	3610	9833	3620	3580
3630	4298	3640	6851	3650	2227
3660	2369	3670	1967	3680	1969
3690	1498	3700	11490	3710	9833
3720	3648	3730	5930	3740	1126
3750	6337	3760	6315	3770	6297
3780	6313	3790	6075	3800	6063
3810	6059	3820	5039	3830	1126
3840	2227	3850	1967	3860	1969
3870	1498	3880	12519	3890	9833
3900	5930	3910	1126	3920	6290
3930	6289	3940	6305	3950	6067
3960	6055	3970	6051	3980	6051
3990	5039	4000	1126	4010	2227
4020	6797	4030	1967	4040	1969
4050	1498	30000	11862	30010	1742
30020	2288	30030	2098	30040	2611
30050	5007	30060	6547	30070	4054
30080	5303	30090	12057	30100	9895
30500	1498				

So you want to write for . . .

ATARI USER

WANT to see your name into print? If you would like to write for us here are a few hints and tips which will give you a better chance of being accepted:

- *Whatever you send us should be of general interest to other Atari users. You may find a program to tell you when your rabbit needs feeding of use, but it's doubtful that there will be a mass market for such a piece of software.*
- *When submitting anything always send both your article and/or program on tape or disc, rather than just on paper. If you have a printer a listed output would be preferable to a typed one. We can't accept handwritten programs, no matter how good they might be.*
- *Don't forget that the same applies to articles. Please send a copy of the text on tape or disc, as we use a method of typesetting directly from Atari micros.*
- *Avoid using non-standard tape or disc formats such as Dos 3, Spartados or increased baud rate tapes. If there is absolutely no way you can send a disc or tape of your text, you should type it clearly, double spaced on white paper. If your work stands out as being good enough we could then get it transcribed on to computer.*
- *While we can't guarantee the return of material sent in to us, if you enclose a stamped self-addressed envelope we will endeavour to see that your work is returned.*
- *Make sure that your name and address and the title of the article or program is on everything you send, including the tape or disc and each sheet of text. A phone number – preferably daytime as well as evening – would also be useful.*
- *Please state clearly that the submission is your own work, and that it is being offered for publication in Atari User and has not been previously submitted elsewhere.*
- *We prefer articles to run to between two and four pages (at about 1,000 words a page, less with diagrams and listings), or to be broken down into separate parts if they are much longer. Rates are paid per final printed word, not by how much material you actually send, so make your article clear and concise.*
- *If you are submitting a program you should explain fully how it works, preferably with a rough line/variable breakdown. Point out any problems which may occur during typing, and how they can be overcome.*
- *Aim to make your programs readable, with plently of REMs to indicate what is going on. However, never jump to a REM statement, as many people like to leave them out when typing in a listing.*
- *Try your program out on an unsuspecting friend. This will often throw up a problem you hadn't even considered.*
- *Try to avoid graphics and machine code placed in strings. Unless there is no alternative, put your machine code into data statements since Control-key graphics are very hard to enter correctly.*
- *Above all, remember that your submission should be interesting, informative, useful or fun, and clearly laid out.*

The address to write to is: Features Editor, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

A technicolour dream come true

CAN you mix the GTIA graphics modes, such as modes 9 and 11, on one screen? This is a problem to me, as they all have the same Display List code – 15.

Do I have to use a Display List Interrupt to change modes, and if so what location do I have to write to to tell Antic that I have changed modes?

I am looking for a mixed mode display like the one in Technicolour Dream. – **Paul Gower, Littlehampton, West Sussex.**

● As you have correctly guessed, the GTIA modes are all represented by the same Display List number – that for a Graphics 8 line.

The change in mode is effected by using location 623. If this is zero the screen will show as Graphics 8. If you POKE it with 64 you will get a Graphics 9 screen, 128 will give Graphics 10 and 192 gives Graphics 11.

This address is a "shadow" location, meaning that its value is read 50 times a second by the OS and placed into the relevant hardware register.

This means that the mode will only change between successive TV frames, thus avoiding messy glitches in the display.

To change the display "on the fly", as you want to do, you must obviously use the hardware register direct – you want to alter the mode more often then 50 times a second.

This register is located at 53275 ($D01B), and takes the same range of values.

You can alter it during a DLI if you wish, generating the kind of mixed mode screen you want.

Don't forget that the OS will place the shadow value from 623 into this hardware register during the Vertical Blank, so each screen will begin with the mode specified in 623 until it reaches your DLI.

Broken joysticks

DO you know anyone that sells spare parts for joysticks? I have had a number of these and it seems to be the same part that goes on all of them.

It's a shame to throw a joystick away if it can be repaired.

I would also like to know if any readers have had the same problem as me in trying to join the US Gold club. I wrote to the address given on one of the games twice, but have never had a reply.

It seems a complete waste of time to join the club if they aren't going to bother to reply to your letters. – **J.J. Smith, Leeds.**

● Atari used to sell joystick repair kits, but we don't think that they are available any more.

Try contacting either Atari or one of their service centres for the part you require, which we suspect is the white plastic insert which goes between the stick itself and the printed circuit board.

Have you tried phoning US Gold about their seeming lack of response? If you haven't had any return for your 90p a quick phone call may well sort the problems out.

Short of loose change

I RECENTLY bought a cassette version of Activision's Ghostbusters. Although the game loads and plays to a certain extent on my 800XL, there seem to be one or two abnormalities.

For instance, I am not given an account number at any stage of the game, so even when I manage to make more money than I started with, I lose it all.

Also there does not seem to be any way of getting back to the equipment section without restarting the game, and hence losing your money? – **L.K. Gorton, Fife.**

● You must make more than 10,000 dollars profit before you are given an account number, so perhaps you haven't got that far yet?

Once you have an account number you may use it each time you start a game to allow you to buy more equipment.

The number is personalised to your name, so make sure you type both correctly each time.

Thwarting cousins . . .

I HAVE written my own text adventure game. To load it I use the CLOAD command. When my cousin comes round, he likes to play my games but he can list the program and change everything, and this annoys me.

I would like to load my games using the Start and Option keys so that they will autorun.

You have printed a program in your February 1987 issue which makes autorun. discs and I wondered if you could print one for autorunning cassettes? – **Garry Hegate, Corringham, Essex.**

● To restore family peace in Essex, just take a look at page 14. This is the first of a three part series tackling exactly the problem you outline.

You could also encode the data in your adventure programs so that your cousin won't be able to alter them so easily, or encrypt the whole program using the methods described in André Willey's article in the August 1985 *Atari User.*

Assembly snags

I AM learning assembly language, and surprisingly finding it not as difficult as I thought. However, there are a few things which I don't understand. For example:

```
255 LDA   #0
260 LDY   #0
300 LOOP STA (CURPAG),Y
310 DEY
320 BNE   LOOP
```

These few lines were taken from a program which clears several pages of memory. Could you please explain line 300?

Also the Y register is decremented below zero, so how will this clear 256 locations?

Lastly, how about a series on advanced sound techniques. All your topics covering Atari computers have been excellent, but you only covered sound very briefly in the early issues.

Incidently, anyone learning assembly language should read Assembly Language Programing for the Atari Computers by Mark Chasin, it is an excellent book. Keep up the high standards. – **B. Fowler, Pen-Y-Fai, Glamorgan.**

● If you used the command

→

STA 710 the contents of the A register are stored at memory location 710.

You could, of course, replace this number 710 with a label, such as COLBAK for example. Thus, STA COLBAK could mean the same as STA 710.

The STA command can be modified in a number of ways, and indexing – which you mention – is just one of them.

This simply means that before the store command is executed, the value in the Y register is added to the address you've given.

If Y contained the number 10, for example, then STA COLBAK,Y would mean store the A register in location 720 – or 710 plus 10.

In the case you mention, Y is set to a value of zero, and as it can only contain numbers between 0 and 255 it must become 255 when it is decremented by one with the DEY command.

This means that the page of memory is cleared in the order 0, 255, 254, 253 and so on until Y is zero again and the program drops out of the loop at the "Branch if Not Equal to zero" (BNE) statement.

In this particular case, the address CURPAG is enclosed in brackets, which simply means that the location CURPAG itself contains a further address which the command will then use.

If we tried it with our COLBAK example, then the A register would not be stored in location 710, but rather in an address given at location 710.

If 710 contained the address $1000, for example, then that location would have the value of A stored in it.

Don't forget that addresses are always stored in two bytes using the 6502's normal lo-hi format, so both CURPAG and CURPAG+1 will contain part of the address value to use.

Thanks for the book suggestion. Now that we have more editorial space, we'll certainly look into the possibility of running more articles on sound commands.

ATARI USER Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

Freezing colour

I HAVE just bought an Atari 800XL and I am not sure how to stop the colours from changing when I leave the machine alone for a while.

I am also looking for a program to store names and addresses along with phone numbers. Is such a program available on cassette? – **I.J. Colquhoun, Aldershot, Hants.**

● The colour change you mention is a feature called *Attract Mode*, and can be halted by pressing any key.

The database is more difficult, as there aren't any such items on cassette – mainly because the cassette system is too slow to make the idea really feasible.

That said, keep looking through the small ads in *Atari User* and other publications in case some enterprising programmer devises one.

Pictures off screen

I HAVE an Atari 800XL and a 1029 printer. Please could you tell me how to take screen shots or to make screen dumps.

I have tried taking pictures of games from the TV, but it never works as there is always a reflection when I use a flash and it's too dark if I don't use a flash. – **Neil Richardson, Camberley, Surrey.**

● You can do screen dumps on to a 1029, but most of the programs that enable this (including the one we published in the September 1985 issue) work from Basic, and thus are only useful to dump your own screens and pictures.

Your best bet if you want to record your high scores, or just take pictures of the game screens to study at your leisure, is to take screen photographs. These can work very well (as you can see from our games review section), but you must follow a few simple rules.

Firstly, don't use a flash – you want to capture the image on the screen, not the pane of glass in front of it.

Secondly, remove as much outside light as possible. This means closing all the curtains and turning off all the lights.

Set up your camera on a tripod or a steady table top and line up the TV screen in the centre. Try to keep your camera the same height as the TV set and square on to the screen.

If you can freeze the game screen you should use an exposure time of between half a second and a second, but if you can't you must try to use a time of 1/15th, or better still 1/25th if your camera has that speed.

Adjust the exposure (f-stop) according to the camera's light meter, or leave it on automatic.

Once you've done all that, focus the camera accurately and use a cable release to avoid any camera shake when you take the picture. You will find that practice quickly makes perfect.

Printer comparison

I WILL hopefully be getting a printer soon. Could you tell me the difference between the 1029 and 1027 printers?

Also I would like to congratulate you on Atari User. *I haven't missed one issue.* – **Andrew Follows, Hassocks, Sussex.**

● The 1029 is a dot matrix machine, which means that its characters are made up of lots of tiny dots. The 1027, on the other hand, is a letter quality printer which works more like a typewriter – its characters are printed by an impact barrel.

The 1027 is great for sending correspondence, but is very slow (about 10 characters a second), while the 1029 is much faster but has a much poorer text quality. Also the 1029 can print graphics, which the 1027 can't.

Monthly discs

I HAVE noticed that you no longer advertise or indeed supply discs or cassettes of programs published in Atari User. *I do not subscribe to MicroLink as I cannot afford a modem at present.*

Is there any way that I might obtain the discs? I am tired of typing! – **H.Cowell, Hemel Hempstead, Herts.**

● We stopped producing the monthly discs and tapes because there was not enough demand for them.

We might consider bringing them back if enough of you write in and ask for them. What do other readers think?

YOUR HINTS AND TIPS

CHIMERA

I THINK I can help James Kelly of Settle, who had a problem with the game Chimera where he was not able to open the doors.

It's quite easy. After having disposed of the first warhead you must guide the robot down the two parallel passages leading in a long straight line downwards, past the hourglass in a grey room.

You will eventually reach a wall at the bottom with a toaster blocking an entrance in it. Follow the passageway around until you get to a gap joining the two parallel passages.

There, if you have not already eaten it, you will find a loaf of bread. Take the loaf (do not eat it) and make your way back to the toaster.

Stand against the toaster and eliminate it. In the toaster's place a life saving drink will appear. Leave this and carry on along the passage until you come to another toaster. Eliminate it and this time press the button to eat the bread. Take and drink the life-saving drink that appears there.

Go back to the other life-saving drink and drink it. Enter the room and you will find a key, with which you can eliminate all four doors.

When you have finished with the key the second warhead can be made by taking the key to the padlock and picking up the padlock. It must then be taken to one of the four blue rooms. – **Robert Lane, Chaddesden, Derby.**

CRYSTAL RAIDER

I DISCOVERED a trick when playing Crystal Raider. If you hold down the joystick button and press Start, you can go round the screens and plan your route without getting killed by the nasties. – **Mark Hodge, Slough, Berkshire.**

STARQUAKE

I THOUGHT that your readers might be interested in the following game tips.

The nearest teleport to the planet's core in Starquake is called Whole. If a key-shaped object can be found, it will allow Blorb to open the vertical doors.

The credit card allows Blorb to enter Cheop's pyramid and also allows access to part of the game beyond the security doors.

Many people seem to be stuck at the point in Mediator where the skeletal horse appears, but I have finally made it past this screen.

The exact solution is almost impossible to explain, but it involves a lot of doubling back and moving downwards, until a horse is lined up correctly with the tree.

Here are some spells to help those stuck in Scrolls of Abadon:

***Walk:** Allows the player to walk against the arrows.*

***Ice:** Freezes the nasties momentarily.*

***Resurrection:** This will give one extra life when the "game over" message is displayed.*

***Sparks:** This surrounds the player with an energy field which is fatal to the nasties.*

***Flight:** Jump to the next level.*

***Vissa:** Highlights the magic discs.*

***Mappa:** Type this then press the space bar to view the map of the whole area.* – **Danny Platt, Bolton, Lancs.**

MERCENARY

I HAVE just been playing Mercenary on my 800XL. I went into the elevator cage at 9:05, got the poweramp and went through a two-way transporter and arrived in a yellow hangar with two doors.

I went through the transporter again, went back to the hangar and took off. I then took the gold to the exchequer and got a big reward.

Then I had a look around in the desert outside the city and found an elevator cage with a craft inside. I kept the poweramp and went E90 in the air.

After 105,000 feet on the altimeter it wouldn't go any higher. Did I escape from Targ? – **Andrew Whittock, Preston, Lancs.**

Function keys

FOR some months now I have been reading your excellent magazine and whereas I am finding it very helpful and full of information, I have one slight criticism.

The space dedicated to 8 bit users appears to be being slowly eroded by the by the ST section. I know that this is also a concern of other 8 bit users who subscribe to Atari User.

I am also having problems programming the function keys on the 130XE. According to the Silica Shop literature, this is possible. Can you help? – **J. Hayes, Borehamwood, Herts.**

● As you can see, Atari ST User has this month become a separate magazine, following an overwhelming response from both ST and 8 bit owners who filled in the survey which we printed in February.

We hope that you enjoy the new *Atari User* and *Atari ST User* magazines.

As for the function keys, you can check for the Start, Select and Option keys by PEEKing location 53279 ($D01F). You will find a number between 0 and 7 here, with 7 meaning no buttons pressed and 0 all buttons.

Bit 0 represents the Start button, bit 1 the Select and bit 2 the Option. Thus the combinations are as follows:

0 Start, Select and Option
1 Select and Option
2 Start and Option
3 Option
4 Start and Select
5 Select
6 Start
7 None

The Help key on XL and XE machines can be read by PEEKing 732 ($2DC). A value of 17 means Help has been pressed, 81 means Shift + Help and 145 means Control + Help.

As this register holds the last pressed value, you must clear it after checking it by using POKE 732,0

Cartridge software

ON the 800XL, what is the cartridge slot for? Can it be used for games? – **R.K. Bond, Borehamwood.**

● Cartridges have always been an alternative way for developers to provide soft-

→

ware for micros. They simply contain programs in rom form rather than on disc or tape.

In fact, on the old Atari 800 there were two cartridge slots, but as this extra slot was rarely used the more recent machines have had only one.

Rom cartridges have the advantage of loading instantly and being almost indestructible. However they are more expensive to produce.

Most of the early games came on cartridge, including PacMan, Star Raiders, Missile Command, Donkey Kong – plus such things as AtariWriter, Logo, Action! and Basic XE.

Recently the cost has proved prohibitive for many games companies, but with the 65XE on the horizon we may once again see an upsurge of cartridge based software.

Speedy service

HOW about this for service? Friday afternoon January 23 I sent for a copy of BMX Simulator for my Atari 800XL from Miles Better Software.

Imagine my surprise when there it was first post Monday morning January 26th I expected to wait at least week. Incidently, BMX Simulator is excellent. – **B.G. King, Christchurch, Dorset.**

Compilations please

WHILE browsing through some very old PCWs I found a Dragon listing in a 1984 issue by one of your, in my opinion, best software reviewers – Bob Chappell. You are forgiven, Mr. Chappell, if this was indeed you!

Why not release a compilation tape and disc with all the best programs from Atari User *back issues?*

Finally, do you or anyone else know where I can buy copies of Thank God It's Friday and Shamus II? – **Mark Kernaghan, Nottingham.**

● We all have a history in this industry and Bob's no exception – whether he tries to live it down or not we aren't quite sure. At least he has a good number of years of experience at his keyboard.

What do other readers think of the compilation idea, then?

Shamus II will be out on the Americana label, or look around for an old Synapse import copy. As for the other title, we're not too sure whether it has been released on the Atari. Can any other readers help?

PEN PALS

Stefan Georgsson, Kriuholar 4, 111 Reykjavik, Iceland.

Ioanidis Nikos, Monastiriou 979, Thesaloniki, 54698. Greece.

Raymond D. Swan, 913 N. 6th Street, Chillicothe, Illinois 61523. U.S.A.

(See also Raymond's letter elsewhere in these pages)

PAL is no friend in the USA

I JUST wanted to write and let you know that I think your magazine is excellent.

I have family in Great Britain, so I have them keeping an eye out for anything to do with Atari. I was very excited when I received my first copy of Atari User *– Volume 1, Issue 6.*

After looking at your magazine I knew that I had to see more. I now have a copy of every issue, and I have also started a friend receiving your publication, and we have also shared our copies with other users. In fact, Atari User *is fast becoming an American favourite.*

I have recently visited Great Britain and was a bit disappointed in the availability of Atari software and magazines, although I must admit that things are not much better in the States.

I did notice that there are imported American Atari magazines available – do you ever plan on Atari User *being available in the United States?*

I have experienced a problem with some British software that I bought, and was wondering if you might be able to offer any help or suggestions.

I own an 800, and the programs that I have been having problems with are Zone-X and One Man and His Droid.

They both look like good games, and when I load them the title screens are fine – but when I try to play them the graphics bounce up and down, making play impossible.

We have tried them on other Ataris but experience the same problem. A friend suggested that the problem is within our television system, rather than in the games themselves.

Otherwise, we have found British software for the most part to be of excellent quality.

I especially enjoy your software reviews and the amount of space you provide for readers letters in the mailbag section. Thank you, Atari User*, and please don't ever outgrow us dedicated 8 bit users.* – **Raymond D. Swan, USA.**

● It's nice to hear from our overseas readers – keep on enjoying the magazine.

Your problem with the tapes is almost certainly to do with the TV system you use. Some American games don't run over here correctly, so the reverse is bound to also be true.

The problem is that in the UK we use a system called PAL which has 50 frames per second with 625 lines per frame.

You use NTSC, which has 60 frames per second, but with only 525 lines.

Thus, although the amount of information displayed per second is roughly the same, any program which relies on the 50 Hz timing signal will work at a different speed in America – and sometimes it won't work at all if the timing is a critical part of the program.

Keep your secrets

HERE'S a way of disguising your disc files to prevent unauthorised access.

You first have to modify the DOS.SYS file so that you can use control characters in your filenames, then you simply include the Clear Screen and the printer Cancel Line codes in your file name.

First, boot your Dos disc with Basic and then use:

POKE 3818,0
POKE 3822,127

You may now save the modified version typing DOS, then using I for format disc and H to write out the new Dos files.

With the new Dos installed, load the file you want to protect and save it using a file name that ends with CHR$(125) and CHR$(24). These characters may be produced by Esc/Shift+Clear and Control+X.

*Now type DOS then A and two Returns and see what happens – amusing isn't it! If you have a printer then type *.*,P: when asked for the filespec information. Then just watch your printer churn out sector sizes but nothing else for your protected files.*

You can still load the files

in the normal way yourself, so long as you use the filename complete with the control characters – so keep a note of the names handy.

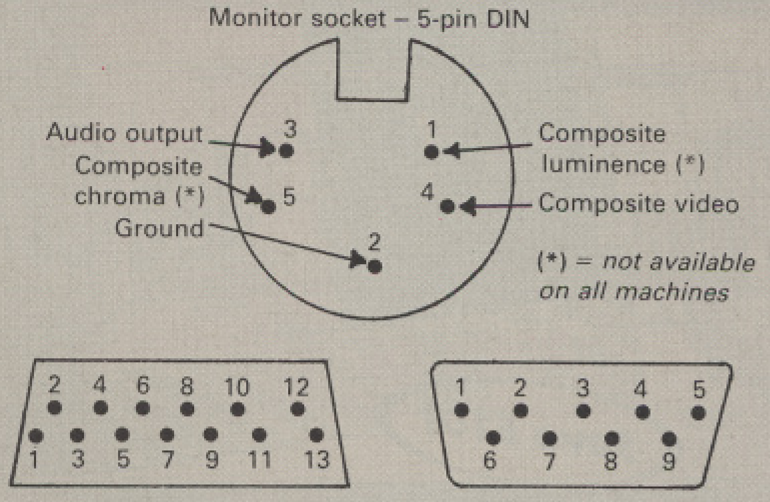
You can't alter the file names DOS.SYS, DUP.SYS or AUTORUN.SYS as those are special names that the disc system recognises.

It should be possible to modify other versions of Dos, but the POKEs will probably be different. – **David Golding, Harrogate, North Yorkshire.**

Port pin outputs

PLEASE could you help me by printing the diagrams for the pin outputs on the Atari 800XL I/O ports? – **Neil Richardson, Camberley, Surrey.**

● Although we have answered this one before, we still get a lot of people asking about these connections. You should have been keeping up with your back issues, because we have covered this issue in the gadgets series. However, just for you, here are the pin-outs one more time:



Serial I/O socket
1. Clock input
2. Clock output
3. Data input
4. Ground
5. Data output
6. Ground
7. Command
8. Motor control
9. Proceed
10. +5/ready
11. Audio input
12. +12 volts
13. Interrupt

Joystick socket – 9-way D
1. Forward (I/O)
2. Backward (I/O)
3. Left (I/O)
4. Right (I/O)
5. B Potentiometer Input
6. Trigger (Input only)
7. +5 volts
8. Ground
9. A Potentiometer input

All sockets viewed from outside of machine

Cartridge capers

IN REPLY to L.P. Arnold's letter in the March issue of Atari User *concerning software compatibilty, I recently upgraded my 800XL (which cost £169 – yes, a victim who bought it 10 days before Atari slashed their prices) to a 130XE (which cost £50 brand new).*

I have had no problems with cassettes or discs, but I have had problems with cartridges. Atari's own fit OK, but I also have Carnival Massacre on rom from Creative Sparks, and this will not fit in the cartridge port.

I would therefore imagine that most if not all Creative Sparks cartridges will be manufactured to the same specifications, and therefore will not fit. I don't know if any other third party cartridges have this problem or not.

Luckily, after visiting the Christmas Atari User Show *and discussing this with a representative from Atari, he suggested removing some of the plastic casing which I did and the cartidge now fits.*

However, I cannot understand why Atari changed the location of the cartridge socket on the XE machine. It would be much better above the keyboard as in the XL model.

Finally, what is the best method for cleaning the drive head in a disc drive – are the special cleaning discs available any good, or should I get it serviced by a reputable dealer. – **N. Henderson, Worksop, Notts.**

● Tackling your cartidge problem first, the casings of the Creative Sparks cartridges are slightly larger than most, certainly, and Atari's suggestion is one way around the problem.

However, all Creative Sparks software is now available on budget cassette rather than cartridge, so you shouldn't have any further problems.

As you say, the port is very inconvenient on the XE, and we can only assume that this was done to clean up the design of the machine – and to make it a little bit cheaper to produce.

Cleaning drive heads is not the easiest job in the world, but the "wet" type of cleaning disc would be best. Otherwise, drop it back into a dealer who can do a full service at the same time.

Computer courses

I WAS reading in the March issue of Atari User *about the Hampshire man, Mr. Roy Goring, who is running a computer correspondence course.*

I have a daughter who is eleven years old and I would like her to have lessons in programming her Atari 800XL computer. She has had it 14 months now, and has certainly not programmed it to its full extent.

She has tried to type in some of the programs from your magazine but has not had a lot of success. If possible, could you please let us know Mr. Goring's address so I could write to him about a possible course for her?

Also, we have bought your magazine since January 1986, but we get it delivered from our local newsagent. Does this qualify us as an Atari User *subscriber, and thus for the special reader offers?* – **Robert Courtney, Thongsbridge, Huddersfield.**

● Roy Goring can be contacted at RJG Programming, Brockhampton Road, Havant, PO9 1NT. Tel. 0705 451214. He should be able to help you out with your typing problems too.

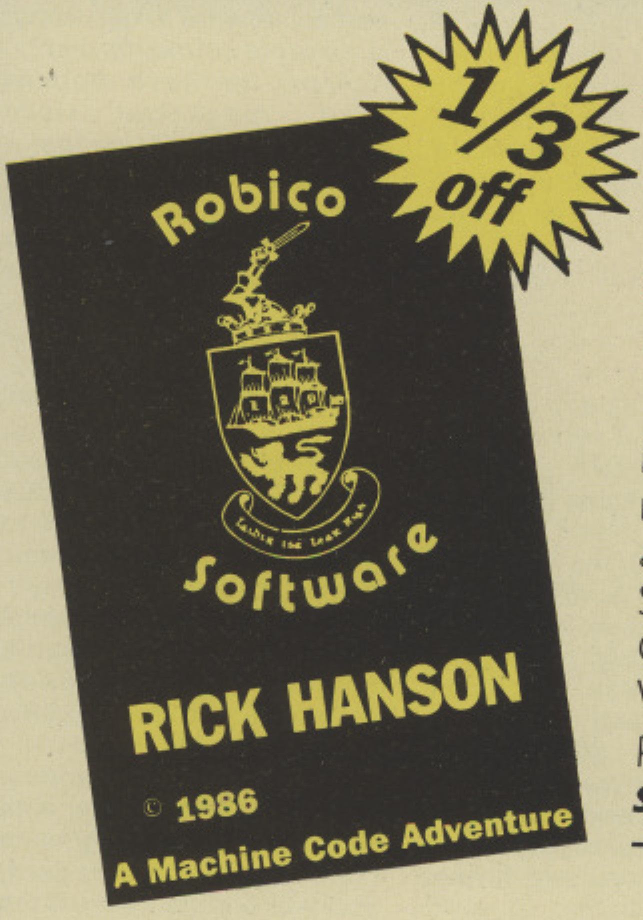
Unfortunately, the special offers are only available with our subscription orders, so you don't qualify at the moment.

That said, if you compare the cost of subscribing with the cost of ordering each issue from a newsagent, you will find you have been paying more for each issue than you needed. Subscription copies can also arrive up to a week before many newsagents have theirs on the shelves.

Running the gauntlet

COULD anyone tell me when Gauntlet is coming out for the 8 bit Ataris? – **Mark Hodge, Slough, Berkshire.**

● That's simple – by the time you read this Gauntlet should be out. See our feature article on the game elsewhere in this issue.



A classic adventure – available on the 8 bit Atari for the very first time!

Rick Hanson met with universal acclaim when it was released for the BBC Micro and Electron. Now it's available on disc for your Atari. As Rick Hanson, Special Agent, your mission is to assassinate the evil General Garantz.

With 230 locations, 70k of text, and a more advanced parser, this top-quality adventure is better than ever!

Special offer price £9.95 – a saving of £5!

Now – the COMPLETE Mercenary Compendium

Here's all you need to get the last ounce of fun and excitement out of one of the most talked-about games of 1986. This is what this package contains:

Escape from Targ. A unique combination of flight simulation, adventure and arcade action, PLUS high speed 3D vector graphics! You crash-land on planet Targ's Central City and you have but one aim – to escape!

Targ Survival Kit. For help when you need it most. Includes maps of Central City and its subterranean complexes. And a novelette, "Interlude on Targ", with more hints and tips.

The Second City. Thought you'd got away? Then load in this extra data set and think again! No hints or clues this time – you're on your own!

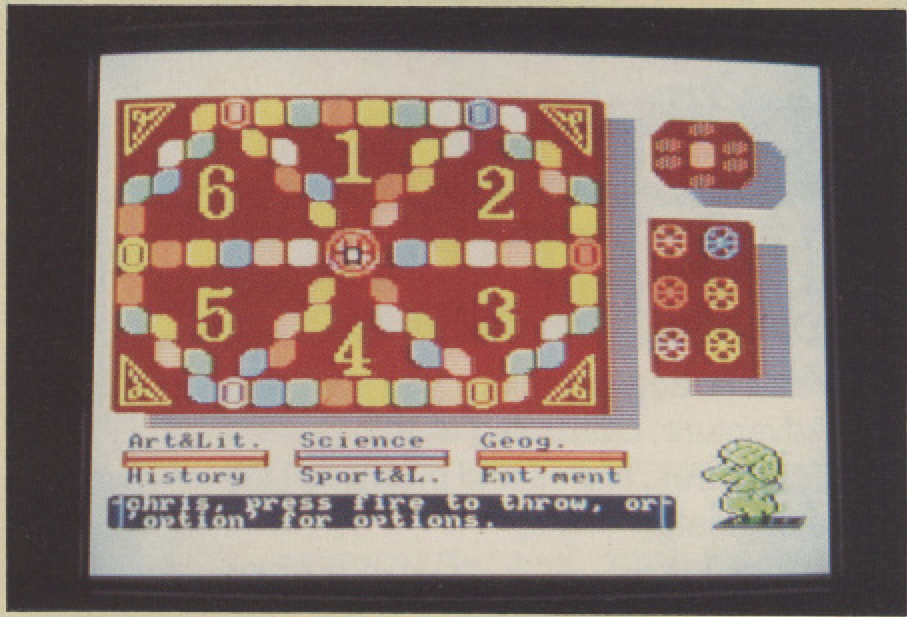


Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari XL/XE	Rick Hanson	Disc	£14.95	£9.95	£5	£18.95	£8
Atari XE/XL*	Mercenary Compendium	Tape	£14.95	£12.95	£2	£17.95	£9
Atari XE/XL*	Mercenary Compendium	Disc	£17.95	£14.95	£3	£19.95	£10

TO ORDER TURN TO THE FORM ON PAGE 61

This is the game you'll want to play . . . and play . . . and play . . .

(And with 3,000+ questions, it'll keep you happy for months!)



Trivial Pursuit™

Only for the Atari 400/800XL, 130XE



At last – the world's most fashionable board game comes alive on your Atari. And it makes the most of the Atari's sound and graphics to take on an entirely new dimension.
Now it can ask you to Name that Tune. Easy? Not when it's played backwards!
Order through this special offer and you'll save £2 off the recommended retail price.
Take out a subscription at the same time and save £5.

Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari XL/XE	Trivial Pursuit GENUS EDITION	Tape	£14.95	£12.95	£2	£21.95	£5
Atari XL/XE	Trivial Pursuit GENUS EDITIO	Disc	£19.95	£17.95	£2	£26.95	£5

TO ORDER TURN TO THE FORM ON PAGE 61

Two top adventure trilogies for you to play

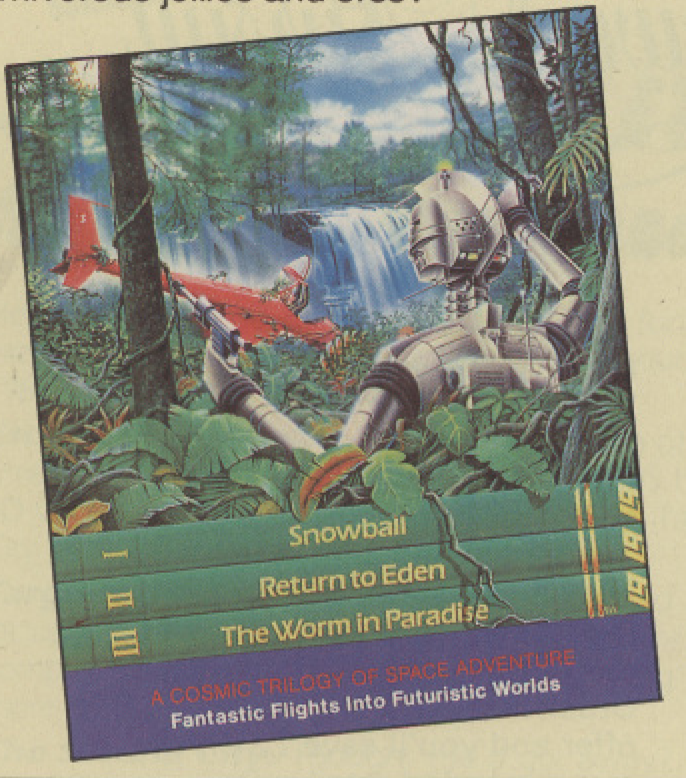
Award-winning software house Level 9 has extensively re-written some of its best-selling adventures, and released them in two trilogies: Jewels of Darkness and Silicon Dreams.

In the Jewels of Darkness trilogy you start with Colossal Adventure, containing all the treasures, creatures, rooms and puzzles of the mainframe original.

In Adventure Quest you must discover the Old Roads to the Dark Tower, Fortress of the Demon Lord. Only there can you defeat him. There's magic in the air in Dungeon Adventure. Can you discover the treasure while facing the perils of skeletons, carniverous jellies and orcs?



You save £6 when you buy one of these packs or £14 if you buy both



The first adventure in the Silicon Dreams trilogy is Snowball. You awake from suspended animation to find your spaceship on a collision course with Eden. In Return to Eden you must prevent the defence robots from destroying your ship. You have lost your memory in the Worm of Paradise, and you may have to join the governing party to regain it.

Each features:

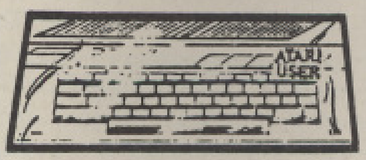
- Over 600 illustrations
- New language interpreter
- Huge 1,000 word vocabulary
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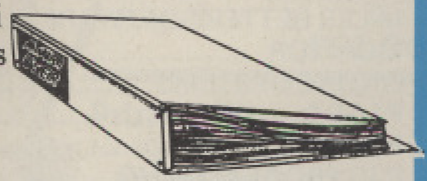
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AT4

TECHNOLOGY SO ADVANCED ...

MEMORY
* 512Kbytes RAM (520ST-M, FM)
* 1024Kbytes RAM (1040ST-F)
* 192Kbytes ROM
* 128Kbytes external plug-in ROM option

ARCHITECTURE
* Motorola 68000 Central Processing Unit (CPU) with a clock speed of 8MHz
* 16-bit external data bus
* 32-bit internal data bus
* 24-bit address bus
* 8×32-bit data & address registers
* 7 levels of interrupts
* 56 instructions
* 14 addressing modes
* 5 data types
* DMA (Direct Memory Access)
* real time clock as standard

GRAPHICS
* full bit-mapped display
* palette of 512 colours

Using Atari Monitors (on 520 & 1040):
* 640×400 high resolution - monochrome
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 80 column text display (40 col low res)

Using Domestic TV (on 520):
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 40 columns × 25 line text display

SOUND AND MUSIC
* 3 programmable sound channels
* frequency programmable 30Hz - 125KHz
* programmable volume
* wave & dynamic envelope shaping
* programmable attack, decay, sustain, release
* Musical Instrument Digital Interface (MIDI)
* MIDI allows connection of synthesisers etc.



MOUSE
* high precision
* 2 button control
* free with 520ST-FM/1040ST-F
* non slip ball motion sensor
* removable ball for easy cleaning

STANDARD SOFTWARE
* GEM desktop + TOS operating system
* ST BASIC interpreter/language system

INPUT/OUTPUT
* MIDI out .... (5 pin DIN) 31.25K baud
* MIDI in .... (5 pin DIN) 31.25K baud
* audio out ... 1.0V DC peak to peak, 10K ohm
* audio in .... 1.0V DC peak to peak, 10K ohm
* RGB monitor .... 1.0V DC, 75 ohm
* mono monitor .... 1.0V DC, 75 ohm
* mono horizontal scan rate 35.7KHz
* mono vertical scan rate 71.2KHz
* sync .... 5V DC (active low) 3.3K ohm
* modem/serial ...... RS232C, 50 to 19,200 baud
* floppy disk .... 250 Kbits/s
* hard disk .... 11.3 Mbits/s
* mouse .... standard Atari connector
* joystick .... standard Atari connector
* cartridge port .... 128K capacity
* RF output (520ST-FM) .... for TV use

OPERATING SYSTEM
* TOS with GEM environment in ROM
* hierarchical file structure with sub-directories and path names
* user interface via GEM, with self explanatory command functions
* multiple windows + icons
* window resizing, re-positioning and erasing
* drop down menus (selected by mouse)
* GEM virtual device interface

COMMUNICATIONS
* RS-232C serial modem port
* 8-bit parallel printer port
* MIDI port (also for networking use)
* VT52 terminal emulation

KEYBOARD
* standard QWERTY typewriter format
* 95 full stroke keys
* 10 function keys
* 18 key numeric keypad + cursor keys
* variable auto-repeat & key click response
* keyboard processor reduces CPU overhead

... IT'S AFFORDABLE

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When you purchase any Atari ST keyboard, you will not only receive the best value for money computer on the market, but you will also receive the following from Atari Corporation as part of the package:

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** NEOchrome - colour graphics program * 1st Word - Word Processor*

In addition, we at Silica would like to see you get off to a flying start with your new computer, so we have put together a special **ST STARTER KIT** worth over £100, which we are giving away **FREE OF CHARGE** with every ST computer purchased at our normal retail prices. This kit is available **ONLY FROM SILICA** and is aimed at providing users with a valuable introduction to the world of computing. We are continually upgrading the ST Starter Kit, which contains public domain and other licensed software, as well as books, magazines and accessories all relevant to ST computing. Return the coupon below for full details.

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At Silica Shop, we have a dedicated service department of five full time Atari trained technical staff. This team is totally dedicated to servicing Atari computer products. Their accumulated knowledge, skill and experience makes them second to none in their field. You can be sure that any work carried out by them is of the highest standard. A standard of servicing which we believe you will find **ONLY FROM SILICA**. In addition to providing full servicing facilities for Atari ST computers (both in and out of warranty), our team is also able to offer memory and modulator upgrades to ST computers.

1Mb RAM UPGRADE: Our upgrade on the standard Atari 520ST-M or 520ST-FM keyboard will increase the memory from 512K to a massive 1024K. It has a full 1 year warranty and is available from Silica at an additional retail price of only £86.96 (+VAT = £100).

TV MODULATOR UPGRADE: Silica can upgrade the 1040ST-F to include a TV modulator so that you can then use it with your TV set. This is an internal upgrade and does not involve any untidy external boxes. A cable to connect your ST to any domestic TV is included in the price of the upgrade which is only £49 (inc VAT). The upgrade is also available for early 520ST computers at the same price.

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We aim to keep stocks of all Atari related products and our warehouse carries a stock of £½ million. We import many software titles direct from the USA and you will find that we have new releases in advance of many of our competitors. Unlike dealers who may only stock selected titles, we have the full range. In addition, we carry a complete line of all books which have been written about the Atari ST. A range as wide as ours is something you will find is available **ONLY FROM SILICA.**

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520ST-M

The affordability of Atari computers is reflected in the price of the 520ST-M keyboard, which is a mere £259 (inc VAT). This version of the ST comes with 512K RAM, as well as a modulator and lead for direct connection to any domestic TV. The price does not include a mouse. In addition, when you buy your 520ST-M from Silica, you will also receive the FREE Silica 'ST Starter Kit'. During 1987, many software houses will be producing games software on ROM cartridges, which will plug directly into the cartridge slot on the 520ST-M keyboard, giving instant loading without the expense of purchasing a disk drive. With the enormous power of the ST, you can expect some excellent titles to be produced, making this the ultimate games machine! If your requirement is for a terminal, then the 520ST-M can fulfill this role too. Leads are available to connect the ST to a variety of monitors, and with the imminent introduction of terminal software on ROM cartridge, the ST provides a low price terminal for business use. If you wish to take advantage of the massive range of disk software available for the ST range, you will need to purchase a disk drive. Atari have two floppy disk drives available, a ½ Mbyte model £149 and a 1Mbyte model £199. Full details of these drives, as well as the Atari 20Mbyte hard disk are available on request. If required at a later date, the mouse may be purchased separately.

£259

520ST-FM

The 520ST-FM with 512K RAM and free mouse, represents a further breakthrough by Atari Corporation in the world of high power, low cost personal computing. This model is the latest addition to the ST family, and is not only powerful, but compact. It is priced at only £399 (inc VAT) a level which brings it within the reach of a whole new generation of computer enthusiasts. When purchased from us, it comes with the FREE Silica 'ST Starter Kit' see paragraph on the left. To make the 520ST-FM ready for use straight away, Atari have built into the keyboard a ½ megabyte disk drive for information storage and retrieval, allowing you easy access to the massive range of disk based software which is available for the ST. This new computer comes with all the correct cables and connections you will need to plug it straight into any standard domestic television set. You do not therefore have to purchase an Atari monitor. If you do require a monitor however, these are available with the 520ST in the following money saving packages:

520ST-FM Keyboard	*Without Monitor*	- ***£399*** *(inc VAT)*
520ST-FM Keyboard	*+ High res mono monitor*	- ***£499*** *(inc VAT)*
520ST-FM Keyboard	*+ Low res colour monitor*	- ***£599*** *(inc VAT)*
520ST-FM Keyboard	*+ Med res colour monitor*	- ***£699*** *(inc VAT)*

Because the 520ST-FM has its own power transformer built into the keyboard, there are no messy external adaptors to clutter up your desk space. You are left with only one mains lead, serving both the disk drive and the computer. You couldn't ask for a more stylish and compact unit.

£399

1040ST-F

For the businessman and the more serious home user, Atari have their most powerful model, the 1040ST-F with 1028K RAM. This low cost powerhouse can be introduced into a business environment as a stand-alone system, or can support a mainframe computer as a terminal. The 1040ST-F not only features twice as much memory as the 520ST-FM, but also includes a more powerful built-in disk drive. The drive featured on the 1040ST-F is a one megabyte double sided model. The extra memory facility of the 1040ST-F makes it ideal for applications such as large databases or spreadsheets. Like the 520ST-FM, the 1040ST-F has a mains transformer built into the console to give a compact and stylish unit with only one mains lead. The 1040ST-F is also supplied from Silica Shop with a free software package and 'ST STARTER KIT'. In the USA, the 1040ST-F has been sold with a TV modulator like the 520ST-FM. However, for the UK market, Atari are manufacturing the 1040ST-F solely with business use in mind and it does not currently include an RF modulator, this means that you cannot use it with a domestic TV (Silica Shop do offer a modulator upgrade for only £49). The 1040ST-F keyboard costs only £599 (inc VAT) and, unless a modulator upgrade is fitted, will require an Atari or third party monitor. There are three Atari monitors available and the prices for the 1040 with these monitors are as follows:

1040ST-F Keyboard	*Without Monitor*	- ***£599*** *(inc VAT)*
1040ST-F Keyboard	*+ High res mono monitor*	- ***£699*** *(inc VAT)*
1040ST-F Keyboard	*+ Low res col monitor*	- ***£799*** *(inc VAT)*
1040ST-F Keyboard	*+ Med res col monitor*	- ***£899*** *(inc VAT)*

The 1040ST-F comes with a mouse controller and includes 1Mbyte of RAM. It has a 1Mbyte double sided disk drive and mains transformer, both built into the keyboard to give a compact and stylish unit, with only one mains lead.

£599

ATARI ST

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